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A REVIEW OF THE CONSTITUENTS OF WHITE AND BLACK MUSTARD SEED.

BY L. E. SAYRE.

If one will take the trouble to review the chemical constituents of white and black mustard, he cannot fail to be impressed by the fact that we have in these two plants of the Cruciferae a most interesting chemical study. Just why these two plants of the same order, of the same genus, indigenous to almost the same countries, growing in similar soil, and in the same climate—why these two plants, with so many conditions and circumstances in common, should elaborate different chemical substances in fructification, and then arrange them in ways so similar, and what the significance of this peculiar fact is, are questions which are beyond our understanding. It is my purpose in this review to compare the chemical constituents of the two seeds, and to bring out, if possible, any other points of interest that may be obtained from a review of the work that has been done by others.

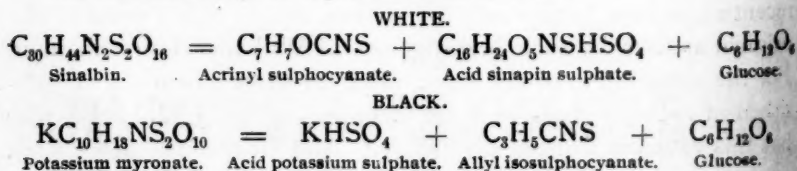
Not many months ago I had occasion to write, for publication, an article which had to do with the subject of mustards. From an oversight on my part, I failed to draw a distinction between the chemical constitution of the two seeds, and when my attention was called to the mistake by a friend, I tried to ascertain how it was that the error had crept into the manuscript. This gave me an incentive to look further into the subject, and to study some of the original articles by such investigators as Will and Laubenheimer. For the compilation of the work done by these chemists, as published in Liebig's *Annalen*, I am indebted to Prof. J. U. Lloyd, who has this valuable work in his library. And for the laboratory work

here I am indebted to Mr. Edward F. Schopflin, of the graduating class of the School of Pharmacy of the University of Kansas.

Mustard was known and used, especially for its volatile oil, many hundred years ago. But not until the early part of the nineteenth century was anything known of the chemical action taking place when water was added to ground black mustard. Will and Hörner, in 1863, established beyond a doubt that the pungent principles developed upon the addition of water were due to the decomposition which took place between a glucoside and a ferment. They made a very thorough study of the black mustard and, some years later, Will and Laubenheimer studied white mustard.

Comparing the gross characteristics of the two seeds, we find in both cases, pre-formed in the seed, a fixed oil, almost the same amount in each, the black seed containing 23 per cent. and the white 22 per cent. The two fixed oils are almost identical in composition. While the compounds that form them may vary some quantitatively, there has been found no compound in the one that has not been shown to exist in the other. In both seed are found a considerable quantity of albuminous matter, also about 19 per cent. of mucilage; but in neither case is there found any (?) starch. Both seed contain the ferment myrosin, the white seed usually containing the larger quantity. The quantity of myrosin in the black seed is quite variable, sometimes going as low as 2 per cent., and again containing as high as 18 per cent. They each yield about 4 per cent. of ash. They each contain a glucoside which resembles that of the other in very many ways, and again differ one from the other very materially in two or three ways. The glucoside sinalbin ($C_{30}H_{44}N_2S_2O_{16}$) from the white seed yields, when decomposed by myrosin, glucose, sinapin sulphate and a fixed oil, which is the sulphocyanate of acrinyl, or, chemically, the ortho-hydroxy-benzyl sulphocyanate. Sinigrin ($C_{10}H_{18}KNS_2O_{10}$), the glucoside from black mustard seed, yields glucose, potassium sulphate, and a volatile oil, allyl isosulphocyanate.

The reactions may be represented as follows:



In reviewing the literature relating to black and white mustard, the average reader is exceedingly liable to be confused and misled; in the first place, because there exists a great similarity between the white and black mustard, and at the same time there exists a very decided difference between the two; then also because of the ever-changing system of nomenclature in use. The glucoside from white mustard has been known under no less than four different names: sulphocyanide of sinapine, sulpho-sinapisin, sinapin, and sinalbin, and, which makes it more confusing, one of these names has been retained for the alkaloid developed from sinalbin by decomposition with myrosin. Even now sinigrin is known by two different names: sinigrin and potassium myronate; and the pungent oil of white mustard is known by three different names, acrinyl sulphocyanate, ortho-hydroxy-benzyl sulphocyanate, and sinalbin-mustard-oil (many believing this to be a volatile oil).

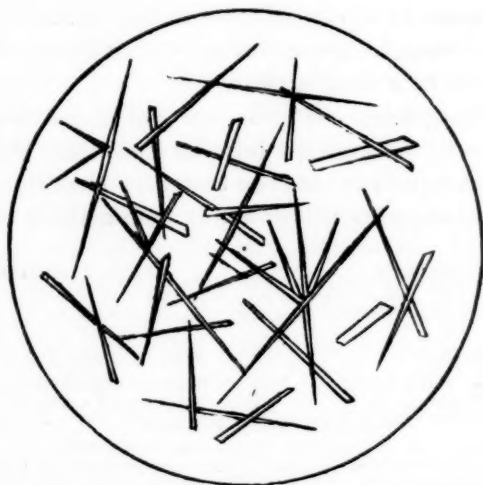
Owing to this general confusion, one has to read with the utmost care, and carefully sift from the miscellaneous mass the points which draw a sharp comparison between the two. The following comparison of their constituents will probably help make it more clear:

BLACK.		WHITE.	
Fixed oil	23 per cent.	Fixed oil	22 per cent.
Stearin,		Stearin,	
• Olein,		Olein,	
Erucic acid ($C_{22}H_{42}O_2$),		Erucic acid ($C_{22}H_{42}O_2$),	
Sinapolic acid ($C_{20}H_{38}O_2$),		Sinapolic acid ($C_{20}H_{38}O_2$),	
Behenic acid ($C_{22}H_{44}O_2$).		Behenic acid ($C_{22}H_{44}O_2$).	
Mucilage	about 19 per cent.	Mucilage.	
Albuminous matter.		Albuminous matter.	
Myrosin (generally less than in white seed).		Myrosin (generally more than in black seed).	
Sinigrin ($C_{10}H_{18}KNS_2O_{10}$), or,		Sinalbin ($C_{20}H_{44}N_2S_2O_{16}$):	
Potassium myronate:		Glucose ($C_6H_{12}O_6$),	Products from Sinalbin.
Glucose ($C_6H_{12}O_6$).		Sinapine sulphate ($C_{16}H_{28}NSO_4$),	
Potassium acid sulphate ($KHSO_4$),		Ortho-hydroxy-benzyl-sulphocyanate	
Allyl-isosulpho-cyanide (C_3H_5NCS),		(fixed oil)	
volatile oil.		$C_6H_4 < \begin{matrix} OH \\ CH_2 \end{matrix} CNS$	
Sinapine sulphocyanate (alkaloid)		Sinapine Sulphocyanate (alkaloid)	
($C_{16}H_{24}NO_3CNS$).			

As it would prolong this paper unduly to give the details of laboratory work in connection with the study, and as this work was designed merely for the purpose of verifying and studying the work that has been done by others, it behooves the writer to make no further reference to this than to say that the constituents of white mustard were extracted, following the process of Will and Laubheimer, and by test-tube experiments the acrid and pungent

principles from the white and black mustard were obtained by the action of the ferment upon the glucosides. In the subjoined paragraphs a statement is made as clearly as possible as to the best methods of procedure in obtaining the principles named.

To obtain *sinigrin* from black mustard seed; reduce them to a fine powder, and express the fixed oil as completely as possible, then extract with benzene (C_6H_6) to remove the remainder. Expose the seed thus treated to the air, and allow the benzene to evaporate completely. Then re-powder and place them in three or four times their bulk of *boiling* alcohol. Boil for about thirty minutes on a water bath and evaporate to dryness; re-powder, and extract with



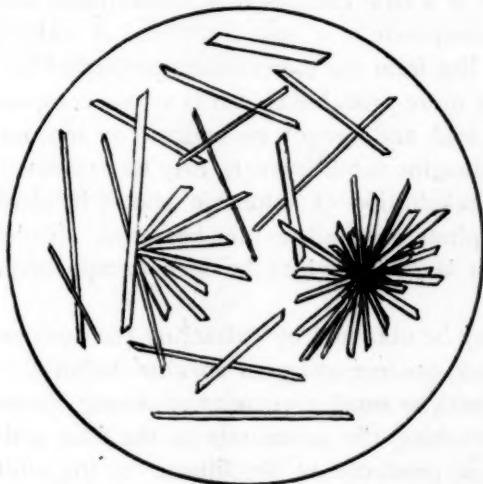
SINIGRIN. From an Alcoholic Solution.

cold water. Treat this with barium carbonate and evaporate on a water bath to dryness. Extract the residue with strong boiling alcohol and filter while *hot*. Set the solution away in a cool place for several days, and sinigrin, or potassium myronate will crystallize out in long, fine, silky needles. From aqueous solution it crystallizes in four-sided prisms. It may be purified by recrystallization from boiling alcohol.

Free myronic acid may be obtained from sinigrin by decomposing it with a concentrated solution of tartaric acid, and adding alcohol.

To obtain sinalbin from white mustard seed, powder finely, and extract the fixed oil completely with benzene (C_6H_6). Spread the

powder out and allow the benzene to evaporate. Re-powder, and place in about four times its weight of boiling alcohol. Boil for thirty minutes, adding sufficient alcohol to make up for loss by evaporation. Filter, keeping filter hot in steam-bath. Set the filtrate aside in a *cold* place for about twenty-four hours. The sinalbin separates out in a crystalline mass. Decant and preserve the liquid. Re-dissolve the residue in hot alcohol. Filter while hot and set aside to re-crystallize. Repeat the crystallization until pure, clear crystals of sinalbin are obtained. It crystallizes very similar to sinigrin in small, pearly needles, concentrically arranged.



SINAPIN SULPHATE. From an Alcoholic Solution.

When pure it is almost colorless, but shows just the faintest shade of yellow. It is sparingly soluble in cold alcohol; it requires 3.3 parts of boiling 85 per cent. alcohol to completely dissolve it. It is easily soluble in water, and insoluble in ether and carbon disulphide; its solutions are neutral. When heated, it melts, forming a yellow liquid, and, when heated still further, is decomposed, evolving fumes of disagreeable odor, and, like sinalbin itself, alkalis turn it intensely yellow, and nitric acid gives with it a blood-red color.

In the liquid preserved from above is contained sinapine-sulphocyanate. It separates out, on standing eight or ten days, in globular aggregations. The liquid may be poured off and the sinalbin

sulphocyanate partially purified by repeating the solution in alcohol and separation several times. Alkalies color it intensely yellow, and acids, if added *at once* to this solution, restore the original sulphocyanate; but if the alkaline solution be boiled and the acid added, a heavy precipitate is formed. This precipitate is *sinapinic acid*, the same which is called by Blyth, *sinapric acid*. Sulphocyanic acid is given off, and remaining in solution is a very deliquescent base, *sinkalin*, which is undoubtedly a derivative of trimethylamine, and has since been shown to be identical with *cholin*.

It might be inferred from the above that the compound is the sulphocyanate of a base composed of sinkalin and sinapinic acid, or that it is the sinapinate of a base composed of sinkalin and sulphocyanic acid. But from the experiments performed by Will on sinapine, it seems more probable that it is a base composed of sinkalin and sinapinic acid, and cannot be isolated on account of its instability. The sinapine sulphocyanate may be converted into the acid sulphate by the addition of sulphuric acid to its alcoholic solution. The acid sulphate crystallizes in beautiful, slender, monoclinic prisms, seldom large enough to be seen except under the microscope.

Myrosin may be obtained by extracting the powdered white seed with *cold* water, concentrating in vacuum below 40° C., and then precipitating with as small a quantity of strong alcohol as possible, filtering and washing the precipitate on the filter with alcohol until no red color is produced in the filtrate by the addition of ferric chloride (even after the addition of water), and no longer colored yellow by ammonia.

The work still remaining to be done on the mustard is the determination to a certainty of the nature of the alkaloid sinapine sulphocyanate, and the investigation of the nature and composition of myrosin.

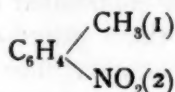
The satisfactory study of the ferments is an exceedingly difficult one, but it seems that there is no reason why we should not be able to analyze and study myrosin better than many other organic compounds that have been studied.

Professor E. C. Franklin, of the University of Kansas, suggested a synthesis of the pungent fixed oil (?) of white mustard. An attempt was made to carry this out, but owing to numerous drawbacks, such as the accidental breaking of sealed tubes containing

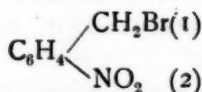
bromine and toluidene, etc., and a want of time, the work was, for the time at least, abandoned.

Professor Franklin suggests that if the composition of the pungent principle of white mustard is as reported, it may be synthesized by the following reactions:

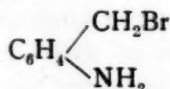
(1) Beginning with the ortho-nitro-toluidene



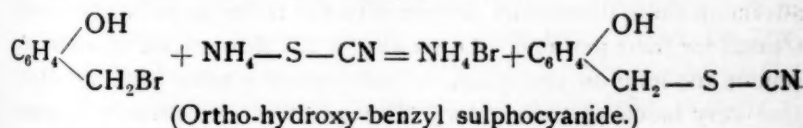
add bromine and heat to 130° to 160° in a sealed tube until the reaction is completed—probably two or three hours. The result will be ortho-nitro-benzyl bromide



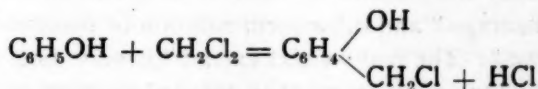
Treat this with a reducing agent ($\text{Zn} + \text{HCl}$). The result will be ortho-amido-benzyl bromide



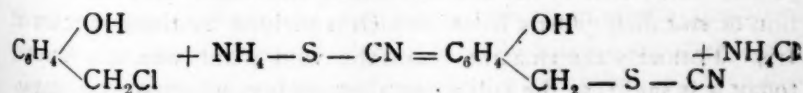
Diazotize this and boil the resulting diazo-compound with water. The resulting compound will be ortho-hydroxy-benzyl bromide. Treat this with ammonium sulphocyanate:



(2) Take carbolic acid ($\text{C}_6\text{H}_5 \cdot \text{OH}$) and treat, in the presence of aluminum chloride (pure), with dichlor methane (CH_2Cl_2):



Treat this with ammonium sulphocyanate:



THE VIOLET PERFUME.

BY HENRY KRAEMER.

One of the large industries of the world requiring a vast expenditure of money and employing some of the most ingenious and educated of men, is the industry for the extraction of perfumes from the plants and animals yielding them. It may be further said that nothing, probably, has contributed more to the welfare and happiness of the race than those plants of pronounced odors and colors. To the rich and poor, alike, they have come at times laden with the unmistakable signs of rest and hope. By the beautiful as well as homely, they have been utilized for their power of adornment. The extent of their influence may be ascertained, possibly, when we recall that the beautiful Countess Eugenie de Montijo draped her gown with violets, "caught" the Emperor Napoleon III and mounted a throne.

There are about 170 species of violets known—but two or three species are sweet-scented, and those cultivated for their perfume are varieties of the species, *Viola odorata* Linné. The chief locality for the cultivation of the violet in large quantities is on the shores of the Mediterranean at Grasse and Cannes. The seeds of the violet are planted either in April or October in olive groves in order to protect the growing plants from either the sun in summer or the cold in winter. In from 4 to 6 weeks the flowers appear and they are then picked twice a week in the morning. In the afternoon these flowers are delivered to the factories and are at once treated for their perfume. Otherwise if the flowers are allowed to remain too long on the plant, or subsequently after picking, they lose very much of their odor. The plant is exceedingly delicate and the harvest is hence very subject to the climatic influences and Sawyer records the suffering to the extent of 75 per cent.

Commercially the perfume of violet is extracted by the cold process of "enfleurage" and subsequent solution in deodorized alcohol as an "extrait." The real "violet extrait" is very fine, but is said to be rarely obtained pure, as that retailed consists of other perfumes, chiefly that of the *Iris* rhizome. This leads to a consideration of so-called "Orris Root," which is yielded by three species of *Iris*. Formerly the rhizome from the wild plant was employed; today it is said that the cultivated rhizome is much more profitably employed.

The cultivation of the iris is not attended with difficulties as it seems to thrive either in a calcareous or damp soil. The rhizome is collected in the early spring. The flags being cut back to within a few inches of the rhizome, and another cut is made across the first tuberous formation. This portion then containing the growing young flag is replaced in the ground, which continues to grow, producing another rhizome, while the remainder of the rhizome is trimmed of its rind, cleaned and dried in the sun. The fresh rhizome—so called "Orris Root"—has an earthy smell, differing but little from the iris of our swamps. The peculiar aroma is developed during a process of drying. The maximum development is said not to be attained for at least two years, and that it even intensifies after that time. The odor of the iris rhizome is similar then to that of violets.

The iris rhizome was distilled with steam by F. A. Flückiger (1876), and he obtained in the distillate "butter of Iris," possessing the characteristic odor of Orris and consisting principally of myristic acid and a minute quantity of an essential oil, to which he claimed the entire fragrance of the root is due. He estimated the proportion of oil in the root to be not more than 1 part in 10,000.

In extracting the oil from the rhizome now they frequently add some dilute sulphuric acid with the water, the idea being to convert the starch into soluble dextrose, the oil then being readily caught up by the steam and carried into the distillate. The yield of oil by this method is greater, but the aroma is not considered to be so delicate. Ferd. Tiemann and Paul Krüger have, during the past ten years endeavored to isolate the chemical principle to which the odor of the fresh flowers of the violet and iris rhizome is due. It has been found impossible as yet to obtain sufficient of the odoriferous material from violet to ascertain whether or not it is identical with that contained in the iris rhizome. They have, however, had considerable success with the iris and have published their investigations thus far in the *Ber. d. Chem. Ges.*, xxvi., 3, p. 2675.

According to these authors, the odoriferous principle of the iris rhizome cannot be obtained directly by distillation with steam. This is due evidently to the large amount of starch contained therein, which, in some way, seems to hold the volatile substances. They, therefore, extract the root repeatedly with ether and then distil the ethereal extract with steam. As a result of the distillation

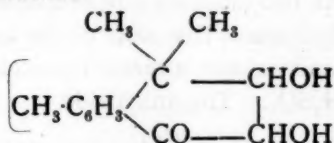
two products are obtained, the one remaining behind being a slimy mass, which, on treatment with alkali, gives myristic acid, ingenin, iridic acid and a brittle, crystallisable resin. In the distillate is the volatile portion consisting of the ethereal oil with a large amount of myristic acid and its methyl salt, oleic acid and an ester of the same, oleic aldehyde and other substances probably in the nature of alcohols that were not further studied. The ethereal solution of this mixture is shaken with a two per cent. KOH solution to remove in part the free organic acids. The remaining organic acids with the esters are further removed by repeated fractional distillation of the oil with steam. The neutral oil, obtained by this distillation treatment, is then dissolved in alcohol, and at the ordinary temperature treated with alcoholic KOH to saponify any organic esters remaining. This alcoholic solution is then poured into water, and the aqueous solution extracted with ether, and the ethereal extraction again distilled with steam. The "Irisaroma" goes over with the first distillate. This oil is then boiled with water + Ag_2O to oxidize any aldehydes present, and so remove the same. The "Irisaroma" being a ketone, is purified by forming a phenylhydrazine compound by allowing equal molecules of the "Irisketone," and phenylhydrazine to remain together for a day at the ordinary temperature, and then distilling this hydrazone mixture with steam. The "Irisketone" remains behind in combination with the phenylhydrazine as a brown oil, which is then decomposed with dilute H_2SO_4 into phenylhydrazine and the "Irisketone" or "Irisaroma," called *Irone*. This is then extracted with ether from the aqueous distillate and rectified under diminished pressure. *Irone* $\text{C}_{18}\text{H}_{20}\text{O}$ is an oil which is scarcely soluble in water, but soluble in alcohol, ether, chloroform, benzol and ligroin. B. P. 144° under a pressure of 16 mm. Specific gravity 0.939 at 20° . Index of refraction $n_D = 1.50113$. It polarizes light to the right and in a dcm. tube to the extent of 40° . The smell of pure irone is sharp and in the concentrated condition quite unlike that of violets. But when diluted with alcohol and exposed to the air the odor resembles that of the natural flowers.

Ironoxime— $\text{C}_{18}\text{H}_{20}\text{NOH}$. The oxime is generally obtained as an oil soluble in alcohol ether, benzol, chloroform and ligroin. Once crystals were obtained, and some of these were subsequently used in obtaining, with great difficulty, however, further crystals from a ligroin solution.

Constitution of Irone.—On treatment with NaClO it yields CHCl_3 , showing that it is methylketone of the formula $\text{C}_{11}\text{H}_{17}\text{Co}\cdot\text{CH}_3$.

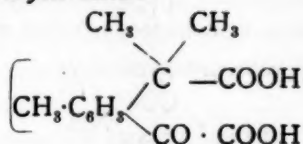
Irene, $\text{C}_{13}\text{H}_{18}$.—On treatment of irone with $\text{HI} + \text{P}$ it loses a molecule of H_2O , and forms a colorless oil Irene, B.P. $113^\circ\text{--}115^\circ$ (9 mm). Specific gravity, 0.9402 at 20° . Index of refraction, $n_D = 1.5274$. It dissolves in concentrated H_2SO_4 , decolorizes a solution of Br in acetic acid, does not combine with picric acid, is gradually converted by air into a resin, burns with a sooty ("rus-sender") flame. When carefully oxidized, Irene yields a series of compounds which throw much light on the constitution of both Irene and Irone.

(a) *Trioxydehydroirene* :



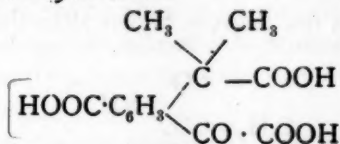
Produced on the addition of Irene to a chromic acid in acetic acid solution. It crystallizes from benzol in highly refractive rhombohedra of M. P., $154^\circ\text{--}155^\circ$ and possesses feebly acid properties.

(b) *Iregenondicarboxylic Acid* :



This acid is yielded by the oxidation of trioxydehydroirene by alkaline $\text{K}_2\text{Mn}_2\text{O}_8$. It crystallizes from hot water in either needles or prisms of M. P. 227° .

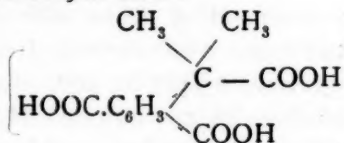
(c) *Iregenontricarboxylic Acid* :



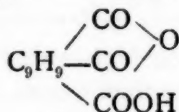
This is formed upon the further oxidation of the foregoing acid, and crystallizes from water at 5° in prisms (granular) holding water of crystallization, which it loses at 110° , and on heating to 227°

melts without decomposition. Its trimethyl ester forms compact crystals of M. P. 127° – 128° .

(d) *Ioniregenetricarboxylic Acid* :

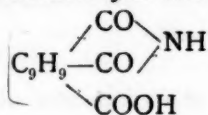


This acid is always produced as the final oxidation product of Irene, when this operation is carried out at first by gentle and then by more powerful oxidizing agents. It crystallizes in white needles, and is slightly soluble in cold water, alcohol or ether, but is soluble in these reagents when they are hot, and is not dissolved by benzol or ligroin. At 150° it loses a molecule of water, and is converted into the anhydride. The salts of the acid crystallize well. The acid is stable, and is not altered by oxidizing agents or by warm concentrated H_2SO_4 . The anhydride



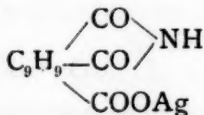
crystallizes from benzol in plates of M. P. 214° , and may be distilled without decomposition. The trimethyl ester of the acid crystallizes from warm ligroin in colorless needles of M. P. 93° .

Imid acid of Ioniregenetricarboxylic Acid :

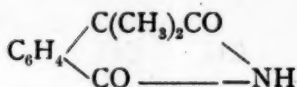


This imid acid is produced when the NH_4 salt of ioniregenetricarboxylic acid is dry, distilled in a current of CO_2 gas. It is a white crystalline powder, which is insoluble in the usual solvents, M. P. over 300° , and boils a few degrees higher than this.

Its Ag salt

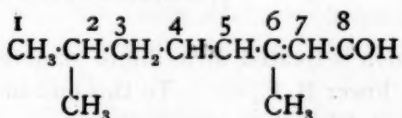


is a white powder which, when heated in a current of CO_2 , yields the imid of dimethylhomophthalic acid



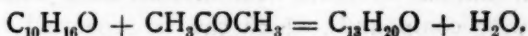
previously prepared by Gabriel.

Synthetical Researches.—The authors made a series of synthetical researches in order to throw further light on the constitution of Irone and Irene. They started with geranial (called by Dodge, citridor-aldehyde), also called citral. This has been shown by Semmler to have the constitution



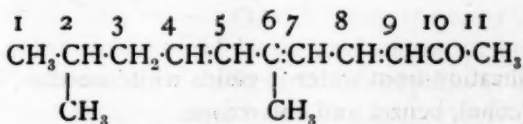
for when treated with KHSO_4 it yields cymol and with HI , (p) isopropylmethylbenzol (cymol) much easier. This geranial is condensed with acetone and yields *Pseudionone* as follows: (Erchmann, p. 173). In a stoppered flask ($1\frac{1}{2}$ L) are added 65 cc. acetone; 50 cc. geranial, and 1 L of cold saturated baryta water. Shake this mixture thoroughly and allow to stand for several days. The products of the reaction are removed with ether, the ether evaporated and the residue distilled under diminished pressure. That which distils at $138^\circ\text{--}155^\circ$ (12 mm) is preserved. From this product the unattacked citral, acetone and other condensation products are removed from the *Pseudionon* with steam distillation. The residual oil is again fractionated and that fraction distilling at $143^\circ\text{--}145^\circ$ (12 mm) is pure *Pseudionon*.

The products of reaction are:

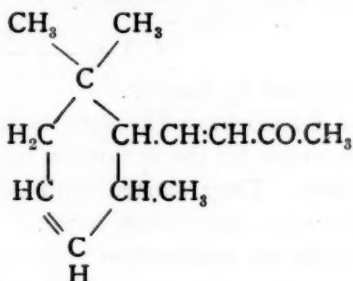


Pseudionon is a clear, colorless oil, B. P. $143^\circ\text{--}145^\circ$ (12 mm.); sp. gr., 0.9044; index of refraction, $n_D = 1.5275$; odor, characteristic and prominent. Its phenylhydrazine and oxime compounds are thick oils. It does not combine with NaHSO_3 . It is changed by alkalies and strong acids into resinous products. With dilute acids, changed to Ionon.

Pseudionon formula:



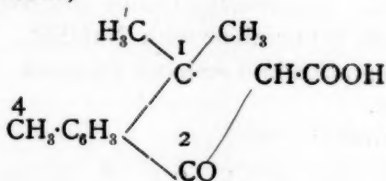
Ionon formula :



When Pseudionon is treated with dilute minerals, it is changed into an isomer of lower B. P., etc. To this end the following mixture is heated on an oil bath at the boiling point; Pseudionon, 20 parts; water, 100 parts; H_2SO_4 , 2.5 parts; glycerin, 100 parts. When cold, extract with ether. Evaporate the ether, and fractionally distil the oil remaining, under diminished pressure. That portion distilling at $125^\circ\text{--}135^\circ$ (12 mm.) is preserved and purified, either by fractional distillation again, or in the same manner as *Irone*. Pure *Ionon* has B. P. $126^\circ\text{--}128^\circ$ (12 mm.); sp. gr., 0.9351 at 20° ; refractive index, $n_D=1.507$. It is a colorless liquid, soluble in alcohol, ether, benzol and chloroform. It possesses an odor similar to the fresh flowers of violets, and resembles that of the vine blossom. When heated with $\text{HI}+\text{P}$, it loses H_2O and yields *Ionene*, $\text{C}_{13}\text{H}_{18}$, which boils at $106^\circ\text{--}107^\circ$ (10 mm.); sp. gr., 0.9338, and refractive index, $n_D=1.5244$. It resembles *Irene* very closely, and has the property of a terpene. It is soluble in alcohol, ether, benzol and chloroform.

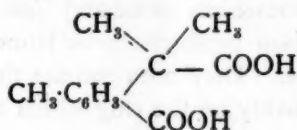
Ionene, on cautious oxidation with chromic acid, yields a mixture of the following compounds, which can be separated by means of their calcium salts:

(a) *Ionogenogonic Acid*,



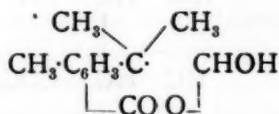
On crystallization from water it yields white needles, M. P. 237° . Soluble in alcohol, benzol and chloroform.

(b) *Ionegenondicarboxylic Acid*,

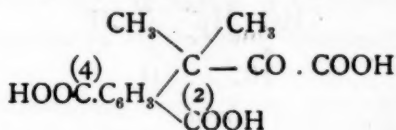


On crystallization from dilute alcohol forms clear vitreous prisms with difficulty soluble in hot water; soluble in ether, alcohol, acetic ether, chloroform and boiling benzol. When rapidly heated it melts at 130° – 131° , but when gradually heated it melts a few degrees lower, and is converted into the anhydride which crystallizes from light petroleum ether in long, white needles, M. P. 105° . The acid is bibasic and its calcium salt when distilled with soda lime yields Cymene.

(c) *Ionegenalide*



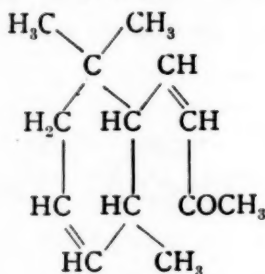
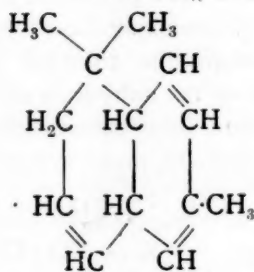
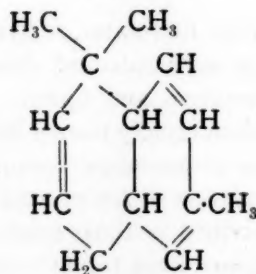
On crystallization from benzol it forms transparent plates, M. P. 175° . It possesses feeble acid properties and has the composition of the semi-aldehyde of ionegenondicarboxylic acid. It does not, however, appear to contain the aldehyde group and is, therefore, probably the aldehyde of the anhydride shown. It is readily converted by oxidation into ionegenondicarboxylic acid. Ionene on direct oxidation with $\text{K}_2\text{Mn}_2\text{O}_8$ yields *Ionegenontricarboxylic acid*,



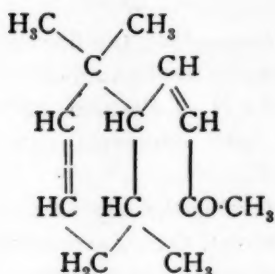
On crystallization from hot water, it forms white granular crystals, sparingly soluble in water, alcohol, ether and acetic ether; insoluble in benzol, chloroform and ligroin. It crystallizes with 2 molecules of H_2O . When rapidly heated it melts at 140° – 145° and decomposes above this temperature forming the anhydride. The final product in the oxidation of *Ionene* acid and of all intermediate oxidation products described is *Ionegenontricarboxylic acid* and is identical with that obtained from *Irene*.

CONCLUSIONS.

The isomeric hydrocarbons *Irene* and *Ionene* are shown by the nature of their oxidation products to be trimethyl derivatives of a tetrahydronaphthalene. They both contain three ethylene linkings of which two are probably on the ring which by the removal of two H atoms is converted into the benzol ring, as this is necessary to account for the terpene-like properties of the two substances. The constitution of *Ionene* follows from that of *Ionone* (being — H₂O), which is shown by its formation from Pseudionone by intra-molecular changes to be probably as indicated in No. 1.

Ionon.*Ionene.**Irene.*

Irone.



It will be seen from the above constitutional formula for *Irone* that it is related to *Irene* (+ H₂O) in the same manner as *Ionene* to *Ionone*. *Ionone* and *Irone* are extraordinarily alike, and can only be distinguished by much practical experience, and the authors believe that there is a great similarity in the constitution of these two compounds. It is probable that either *Irone*, *Ionone*, or some optically active isomeric substance is present in the violet blossoms, but this has not yet been decided.

Ionone and *Irone* are both without injurious effects on the animal organism, as experiments were conducted upon some dogs by Prof. Dr. F. v. Mering, and the author himself took three drops.

Other plants¹ having odors resembling the Violet, are the following :

(a) *Costus*, being the root of *Aplotaxis lappa*, Decaisne, of the N. O. Compositæ. It grows in the Northwestern Himalayas, at from 10,500 to 13,000 feet. The dried root yields 1 per cent. of a light yellow volatile oil of sp. gr. 0.982, and rotatory power in 100 mm. tube = + 15° 29'. It begins to boil at 275° C., and about half passes over below 315° when decomposition takes place (Schimmel).

(b) *Carlina gummifera*, Lesson, being the "White Chameleon" of the ancient Greeks. It possesses a root, said to be as thick as a man's thigh, and to develop a powerful violet odor when dry. It is identical with *Acarna gummifera*, Willd.; *Atractylis gummifera*, Linn.; and *Cincus carlinæ folio*, *Gummifer acanleatus*, Tourn.

(c) *Myall wood*, being the wood of *Acacia homalophylla*, whose habitat is Australia, and is said to be fragrant, so long as the wood is not polished.

¹ Sawyer, in "Odographia."

(d) *Tritelia uniflora*, of N. O. Liliaceæ; habitat, Buenos Ayres; flowers.

(e) *Deudrobium heterocarpum*, the flowers of an orchid.

(f) *Oncidium inosmum*, the flowers of an orchid.

(g) *Geonoma pamila*, N. O. Palmeæ; habitat, tropics of the Western Continent. The violet odor emanates from the young green parts.

(h) *Many acacias* develop the odor of Cassie, which is considered an approach to the violet, as: *A. farnesiana*, Willd.; *A. bertoloni*; *A. lophantha*, *A. dealbata*, *A. pycnantha*, *A. suaveolens*, *A. odoratissima*, Willd.; *A. latronum*, Willd.; and *A. lomatocarpa*, DeCandolle.

STRUCTURE OF OUR HEMLOCK BARKS.

BY EDSON S. BASTIN.

Only five species of the genus *Tsuga* are known; two of these belong to Eastern Asia, one, *Tsuga Canadensis*, Carrière, is the common hemlock spruce of the Eastern United States; and the other two, *Tsuga Mertensiana*, Carrière, and *Tsuga Pattoniana*, Brewer and Watson, are natives of the Pacific Coast of North America. All are trees of large size and graceful habit, and the first four are very closely allied, being so similar in appearance that they are with difficulty distinguished, while the fifth, *Tsuga Pattoniana*, is somewhat aberrant in its characters, approaching more closely the pines and spruces in its structure.

Tsuga Canadensis is an abundant species in many portions of the Eastern United States and Canada, ranging in its habitat from Nova Scotia to Delaware on the east, extending southward along the Alleghanies to Alabama, and westward along the northern ranges of States and the Canadian border to Minnesota. It is easily distinguished from the coniferous trees with which it is associated, by its small cones, one-half or two-thirds of an inch long, pendulous at the ends of the branches; by the slender, spreading branchlets which have crowded apparently two-ranked leaves along their sides; and by the distinctly petiolate, flattened, linear, denticulate leaves, which are green above and glaucous beneath, and provided with a single resin duct on their dorsal surface. Its trunk is extensively employed for lumber and its bark for tanning purposes. Its pitch, also, which is extracted from the old bark by boiling, is employed

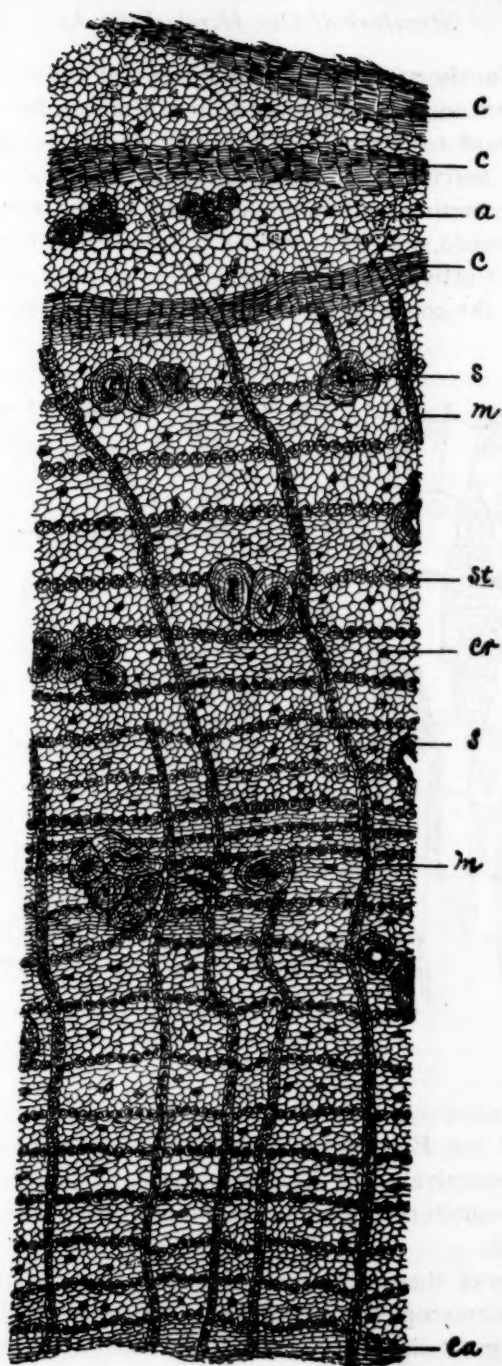


FIG. 1.

in medicine for the same purpose as Burgundy pitch. *Tsuga Mer- tensiana* occurs on the Pacific Coast from the vicinity of San Francisco northward to Alaska. While very similar in appearance to our Eastern species, it is, when fully developed, a tree of much larger size, sometimes attaining a height of 200 feet. It is also straighter-grained, and has a redder and usually thicker bark; but the most distinctive difference, perhaps, is in the fruits and seeds, the scales of the cones being more elongated and the wings of the

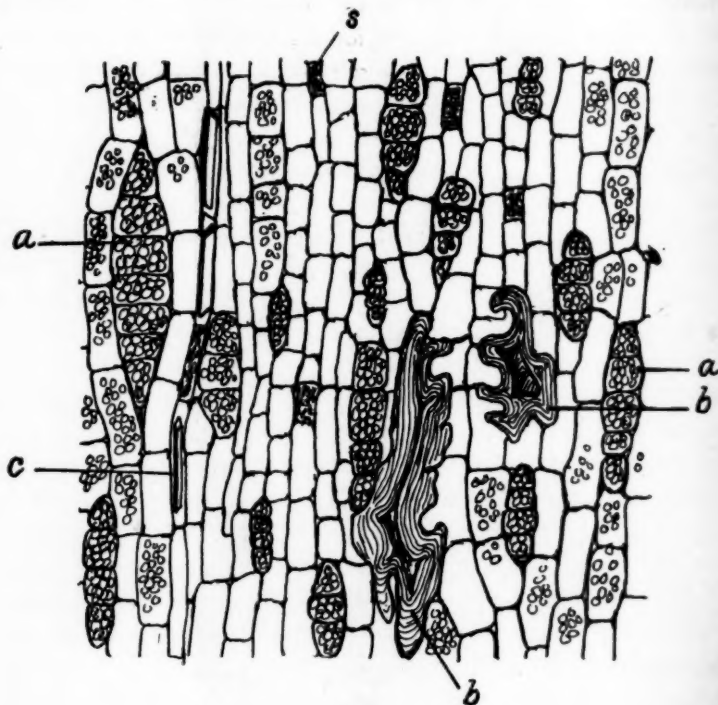


FIG. 2.

seeds being relatively longer and straighter. The wood and bark, like those of our Eastern species, are used for lumber and tanning purposes, respectively, but whether or not any commercial use is made of the pitch certainly obtainable from the bark, the writer is not informed.

The barks of these two species are the only ones the writer has examined microscopically. The barks show, as might have been expected, a great similarity in structure, though there appear to be

some characters which we may rely on for distinguishing them. In both, cork formation begins early, and in all cases where the bark has been taken from stems more than a few inches in diameter, the secondary cork-formations have invaded the inner layer of the bark, and bands of cork will be observed crossing at various angles the medullary rays. The cork in both is colored a deep purple, and this coloring matter is bleached out only with difficulty, even by Labarraque's solution. This coloring matter appears to differ in composition from the reddish-brown coloring matter found in the tissues between the bands of cork, for not only is the color a different shade of red, but it bleaches more readily. Tests for tannin show that in both species, also, the white or colorless younger portions of the bark contain little of it, while the older portions, particularly the dead sieve and parenchyma tissues between the bands of secondary cork, are exceedingly rich in it. Stone cells of large size and often quite irregular shape occur, either isolated or clustered in



FIG. 3.

groups of several or many, throughout all except the youngest portions of the inner bark. They are quite numerous, but are distributed without apparent order. They are marked with numerous very fine pore-canals, and very numerous and fine concentric lines. Abundance of starch was found in the bark of *Tsuga Canadensis*. The medullary ray cells and the tangential rows of large parenchyma cells, which occur at frequent and regular intervals in the inner bark, were found to be especially rich in it; but, strange to say, no starch was observable in the bark of *Tsuga Mertensiana*, although there were a similar structure and arrangement of medullary ray-cells and there were the tangential rows of large parenchyma cells, the same

as in the other species. The very close structural resemblance of the barks, and the very intimate relationship of the two species in habit as well as in structure, suggest that the presence of starch in the one and its absence in the other was only a seasonal differ-

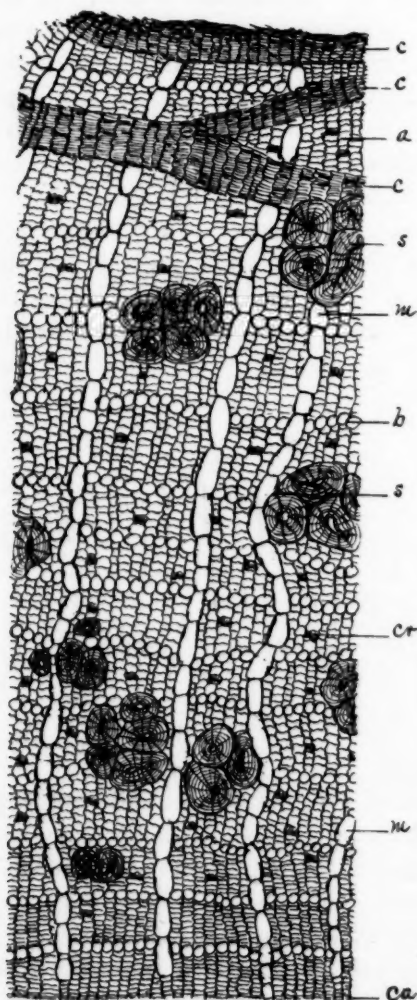


FIG. 4.

ence. But this is a point which requires further investigation. The medullary rays in both barks are composed of single rows of cells, and these are radially elongated and of large size as compared with

those of adjacent tissues; but those of *Tsuga Mertensiana* are, on the average, larger, and the rays in this species, as seen in a longitudinal-tangential section are composed, on the average, of a larger number of cells. These differences in the medullary rays are perhaps the most constant ones between the two barks.

Both barks contain abundance of crystals of oxalate of calcium. These are mostly in the form of long prisms, and are contained in

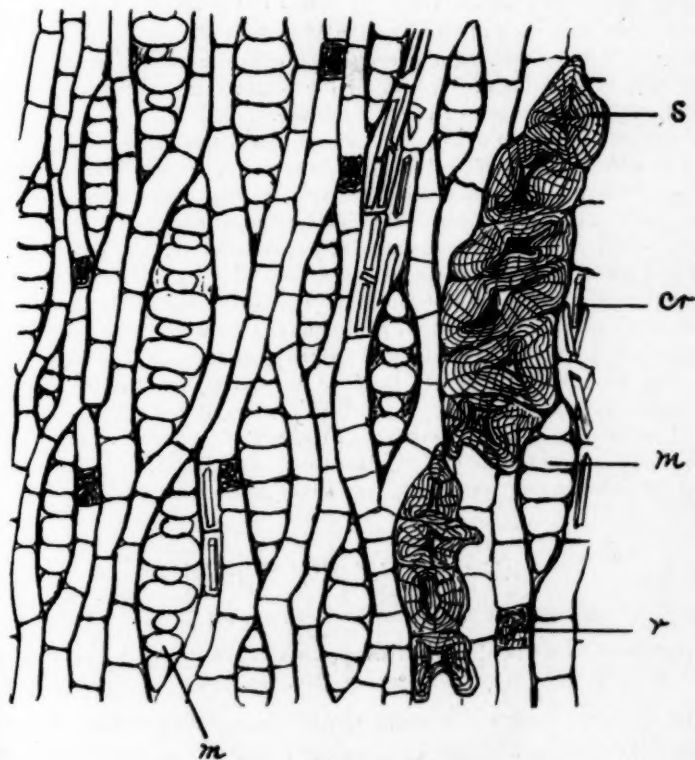


FIG. 5.

rows of elongated cells of narrow diameter, which traverse the bark in the direction of its length. The crystals are frequently associated in the containing cells with resinous and coloring matters. In form and arrangement they do not differ in the two barks, but appear to be rather more abundant in the Pacific Coast species.

Oleo-resin cells appear to be about equally abundant in the two species. Those that do not also contain crystals are isolated or in

rows of two or three, and the cells are shorter and broader than the crystal cells, though they are not usually so large as the parenchyma cells with which they are associated. They are scattered without apparent order through the inner bark. Besides the oleo-resin cells proper, just described, oleo-resin occurs in many cells not especially devoted to secretions. This is particularly true of the cells in the older portions of the bark.

DESCRIPTION OF FIGURES.

Fig. 1.—Small portion of cross-section of bark of *Tsuga Canadensis*, magnified about 50 diameters. *c, c, c*, secondary cork formation; *a*, dead phloem tissues rich in coloring, resin and tannic matters; *s, s*, stone cells; *m, m*, medullary rays; *cr*, crystal cell; *ca*, cambium.

Fig. 2.—Small portion of longitudinal-tangential section of the inner bark of *Tsuga Canadensis*, magnified about 75 diameters. *a, a*, medullary rays, the cells containing much starch; *b, b*, stone cells; *c*, row of cells containing crystals of calcium oxalate; *s*, cell containing oleo-resinous secretion.

Fig. 3.—A few of the crystals magnified 230 diameters.

Fig. 4.—Small portion of cross-section of bark of *Tsuga Mertensiana*, magnified about 50 diameters. *c, c, c*, bands of secondary cork; *a*, intervening dead tissues composed of sieve and parenchymatous elements, and like the other species, rich in tannic, resinous and coloring matters; *s, s*, groups of stone cells; *m, m*, relatively large, fusiform medullary-ray cells; *b*, band of large parenchymatous cells; *cr*, crystal cell; *ca*, cambium cells.

Fig. 5.—Small portion of longitudinal-tangential section of bark of *Tsuga Mertensiana*, magnified about 75 diameters. *s*, cluster of stone cells; *cr*, crystals of calcium oxalate; *m, m*, medullary rays; *r*, oleo-resin cell.

SYRUP OF FERROUS IODIDE.

BY CHARLES F. CARTER, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 143.

The United States Pharmacopœia designates syrup of ferrous iodide as "a syrupy liquid, containing about 10 per cent., by weight, of Ferrous Iodide [$\text{FeI}_2 = 308.94$], or about 13.4 gm. in 100 c.c."

This preparation has always been considered as tedious to make, and also as difficult to maintain in a perfect state, on account of the unstable character of the ferrous compound, which is prone to decompose with the liberation of iodine. To guard against the presence of free iodine, the Pharmacopœia orders that, to be official, a syrup should not show a blue color when it is mixed with a small quantity of starch test solution.

With the idea of ascertaining the condition of the article as supplied to the retail trade by manufacturing firms, ten samples were procured and examined in regard to both free iodine and amount of ferrous iodide contained.

Some of the samples were obtained directly from the producers; the others were bought from retail pharmacists.

That a comparison of the results might be made with those obtained from a product of the official process, the author prepared a sample by this means. It possessed the standard pale green color.

The test with starch was employed to detect the presence of free iodine. The content of ferrous iodide in the samples was determined by the official method, which consists of completely precipitating the iodide, in the presence of nitric acid, by the addition in excess of a known volume of decinormal silver nitrate volumetric solution, and of subsequent titration of the excess of silver in the known volume with a decinormal potassium sulphocyanate volumetric solution.

The estimation is ordered to be performed in the presence of ferric ammonium sulphate, which will indicate, by the production of a red color of ferric sulphocyanate, upon the continued addition of the potassium sulphocyanate solution, the complete precipitation of the excess of silver.

In adjusting the strength of the potassium sulphocyanate solution, by titration against decinormal silver nitrate volumetric solution, the Pharmacopœia directs .5 c.c. of ferric ammonium sulphate test solution to be used as the indicator, whereas, in the estimation of ferrous iodide in the official syrup, it orders 5 c.c. of the same test solution.

Tentative experiments having shown that the results obtained when the smaller volume was used were as uniform as those afforded in the presence of the larger volume, the smaller amount was adopted, for the reason that the solution of potassium sulphocyanate was standardized by its aid.

The following results show about one-half of the syrups of ferrous iodide placed on the market by manufacturing pharmacists to be of good quality.

The percentage results were calculated from the amount of decinormal potassium sulphocyanate volumetric solution over 1 c.c.

required to completely precipitate the silver; each c.c. in excess of this amount, which is prescribed by the Pharmacopœia, denotes a deficiency of 1 per cent. of ferrous iodide.

Number of Sample.	Location of Manufacturer.	Color.	Free Iodine.	Percentage of FeI ₂ .
1	Boston.	Greenish-brown	Present in small amount	10
2	Baltimore.	Pale green; later, brownish-green.	Present.	10
3	Philadelphia.	Pale greenish-yellow.	None.	8.6
4	Indianapolis.	Pale green.	None.	10
5	Detroit.	Pale green.	None.	10
6	Philadelphia.	Pale green.	None.	7.5
7	Philadelphia.	Pale green.	None.	10
8	Philadelphia.	Brown.	Present in large quantity	5.1
9	Philadelphia.	Greenish brown.	Present.	6.8
10	Detroit.	Pale green.	None.	10
11	Own make—Philadelphia	Pale green.	None.	10

The experience of the author leads him to believe that the present official process, when conducted with the proper care, will furnish a syrup of good quality. In conclusion, he would recommend every one who makes or uses the preparation to test it, according to the Pharmacopœia, for both free iodine and the amount of ferrous iodide.

BENZIN.

BY WILSON C. McCLOSKEY, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 144.

After defining benzin as "a purified distillate from American petroleum, consisting of hydrocarbons, chiefly of the marsh-gas series [C_5H_{12} , C_6H_{14} , and homologous compounds]," the United States Pharmacopœia describes it as "a transparent, colorless, diffusive liquid, of a strong, characteristic odor, slightly resembling that of petroleum, but much less disagreeable, and having a neutral reaction." The same authority assigns to benzin a specific gravity of .670 to .675 at 15° C., and a boiling point of 50° to 60° Centigrade.

To permit the purified distillate to contain hydrocarbons having more than six carbon atoms in the molecule is certainly to afford it a ripe opportunity to deviate from the stringent official requirements in specific gravity and boiling point.

The existence of such a deviation must surely have been suspected by every pharmacist who has noticed the odor of the benzin usually handled by the trade.

In order to determine the extent of this variation, the writer examined samples of benzin which were purchased at eighteen retail pharmacies and at five paint stores, all of which were located in Philadelphia.

All of the samples were transparent and colorless.

The odors were noted from equal volumes of the samples contained in vessels of the same capacity. When examining the table of results, the reader should understand the word "normal," when applied as the description of odor, to mean a freedom from the odor of petroleum.

The samples were all neutral to litmus paper, and water agitated with them remained neutral to the same substance.

While ascertaining this last fact, peculiar behaviors of some of the samples, when agitated with water, were noticed.

When shaken in graduated cylinders with equal volumes of water and then permitted to rest, some of the samples demonstrated their conformity to the official requirement of insolubility in water, for the two layers that separated were equal in volume. But when other samples were treated with water in this manner an increase in the volume of the lower, or water, layer was noticed; and when still other samples were subjected to this treatment the upper, or benzin, layer was found to have been increased.

These observations were first made upon volumes of 10 c.c. each of water and sample. For the purpose of observing these phenomena from larger quantities, a line of experiments was instituted in which 50 c.c. of each liquid were employed. These experiments were attended with interesting results, for in the cases of some samples a strange reversion of the solubility occurred. When the experiments were repeated to insure certainty, the same behaviors were again observed.

The specific gravities were taken at the temperatures of the samples with a Westphal balance. As the densities thus indicated were in almost all instances greater than .675, it was considered unnecessary to determine them at 15° C.

The boiling point of each sample was found by distilling a convenient quantity (22 c.c. of each lot) from a fractioning bulb. A Centigrade thermometer was inserted almost to the bottom of the bulb.

The lower temperature given in the chart was that at which the first distillate passed over, while the higher temperature was that registered at the conclusion of the distillation, or when, approaching the end, the process was proceeding very slowly.

Any liquid that refused to distil from the bulb upon prolonged application of the highest recorded temperature, was transferred to a warm dish. The residues of petroleum given in the chart were detected by this means. When a portion of each sample was boiled for a few minutes with one-fourth its volume of spirit of ammonia and a few drops of silver nitrate test solution, the ammoniacal liquids were not turned brown, thereby showing their freedom from pyrogenous products and sulphur compounds by this pharmacopoeial test. To obtain data for comparison, some kerosene was examined in the same manner as was the benzin.

The results are furnished in the chart.

SAMPLES FROM RETAIL PHARMACIES.

Number of Sample.	Odor.	Specific Gravity.	Temperature.	Boiling Point.	INTERSOLUBILITY WITH WATER.		Residue in Dish.
					10 c.c. of each.	50 c.c. of each.	
1	Normal	•6866	25°	73° — 123°	None	None	Distinctly petroleum
2	Normal	•6806	25°	72° — 133°	None	None	None
3	Slightly petroleum	•6860	25°	66° — 100°	None	None	Distinctly petroleum
4	Slightly petroleum	•6805	25°	69° — 115°	None	None	None
5	Decidedly petroleum	•6820	25°	80° — 135°	None	None	Distinctly petroleum
6	Decidedly petroleum	•6802	6.5°	55° — 96°	Water in sample 0.5 c.c.	None	None
7	Slightly petroleum	•6905	25°	80° — 115°	Water in sample slight	Water in sample 1 c.c.	None
8	Slightly petroleum	•6811	25°	67° — 121°	Water in sample slight	Water in sample 2 c.c.	Distinctly petroleum
9	Decidedly petroleum	•6886	25°	65° — 109°	Water in sample slight	Sample in water slight	Distinctly petroleum
10	Decidedly petroleum	•6889	24.5°	78° — 102°	Water in sample 1 c.c.	Sample in water slight	Distinctly petroleum
11	Decidedly petroleum	•7080	24.5°	94° — 120°	None	Sample in water slight	Distinctly petroleum
12	Decidedly petroleum	•6799	24.5°	64° — 120°	None	Sample in water slight	None
13	Strongly petroleum	•7133	24°	97° — 137.5°	None	Sample in water slight	Distinctly petroleum
14	Slightly petroleum	•7102	24.5°	87° — 131°	Water in sample slight	Water in sample 1 c.c.	None
15	Decidedly petroleum	•7272	25°	106° — 145°	None	Sample in water slight	Distinctly petroleum
16	Decidedly petroleum	•6811	25°	60° — 105°	Water in sample 4 c.c.	Sample in water slight	Distinctly petroleum
17	Decidedly petroleum	•7090	25°	89° — 120°	Sample in water 2 c.c.	Sample in water slight	Distinctly petroleum
18	Slightly petroleum	•6832	25°	68° — 113°	None	None	None

SAMPLES FROM PAINT STORES.

Number of Sample.	Odor.	Specific Gravity.	Temperature.	Boiling Point.	INTERSOLUBILITY WITH WATER.		Residue in Dish.
					10 c.c. of each.	50 c.c. of each.	
1	Slightly petroleum	6720	26°	50° — 109°	Sample in water about 0.5 c.c.	None	None
2	Decidedly petroleum	7122	26°	97° — 139°	Water in sample 1 c.c.	None	Distinctly petroleum
3	Slightly petroleum	7144	26.5°	91° — 146°	Sample in water 1 c.c.	Sample in water 0.5 c.c.	Distinctly petroleum
4	Normal	7128	27°	94° — 128°	Water in sample 0.5 c.c.	None	Slightly petroleum
5	Slightly petroleum	7159	26.5°	93° — 123°	None	None	Black
	Petroleum (Kerosene)	7813	27°	149° — 200°	None	None	Distinctly petroleum

SOME COMMERCIAL ALOINS.¹

BY CHARLES H. LA WALL, PH.G.

"Read not to contradict nor to believe, but to weigh and consider."

The foregoing well-known precept from Lord Bacon was forcibly recalled by the contradictory statements made in the literature upon the subject of the aloins. Of all proximate plant principles there are few, if any, that have such a wide range of physical characteristics attributed to them as have these.

The examination of a commercial sample of aloin, and the application of the requirements of the Pharmacopœia for identity and purity, led the writer of this article to consult various authors for confirmation of certain ascribed properties. Instead of enlightenment upon the subject, confusion seemed to attend every inquiry as to its physical characters, especially that of solubility. Almost every author assigned a different degree of solubility to each of the several varieties, and few of these were actually verified upon examination of a number of samples from reputable manufacturers.

These discrepancies led to a thorough review of the literature upon the subject, and a few references from different authorities are given in regard to its physical characters, together with the result of the examination of the commercial specimens, and it is hoped that with the aid of others who may be interested in the subject, researches may be carried on which will eventually produce uni-

¹ Read before the Pennsylvania Pharmaceutical Association, June, 1895.

formity and correctness in the requirements of our official guide with reference to this substance as well as numerous others.

Aloes, which is the inspissated juice of various species of Aloe (Nat. Ord. Liliaceæ), was mentioned by Celsus and Dioscorides, who lived in the first century A. D., and it was probably known for several centuries previous to this. Those persons wishing a complete history of the drug itself are referred to "Flückiger's Pharmacographia," and *Pharmaceutical Journal and Transactions*, 2d series, Vol. 10, page 106.

In 1851 a crystalline principle was isolated from Barbadoes aloes by T. and H. Smith.¹ This principle was analyzed by Dr. Stenhouse, who named it aloin, after proving it to be a neutral principle different from the previously-mentioned aloetin of Robiquet.² The discoverers of this new substance mentioned that one ounce of cold water only dissolved one grain of aloin, but that it was more soluble when warmed.

In the same year Jonathan Pareira³ mentioned the possibility of the existence of a similar principle in Socotrine aloes. Five years later T. B. Groves⁴ discovered an aloin in this variety, and the name of the previously-discovered principle was changed to Barbaloin to indicate the difference in the source of the two principles, which resembled each other in some respects, but behaved differently in their deportment with various reagents.

Still later, Nataloin and Zanaloin were discovered, the former from Natal aloes, by Professor Flückiger,⁵ in 1871, the latter by Histed, assisted by Flückiger, in the same year, from Zanzibar aloes (a variety of Socotrine aloes imported via Zanzibar). Zanaloin was afterward pronounced identical with Socaloin.

Dr. Shenstone⁶ subsequently extracted an aloin from Jafferabad aloes, which he found to be identical with Zanaloin and Socaloin. He then proposed that the confusing nomenclature of the aloins be changed; Nataloin to be applied to the principle from Natal aloes, *α*-Barbaloin to the principle from Barbadoes aloes and

¹ *Pharm. Jour. Trans.* (1), 10, page 23.

² *Jour. de Pharm.* (3), 10, 173.

³ *Pharm. Jour. Trans.* (1), 11, 439.

⁴ *Pharm. Jour. Trans.* (1), 16, 128.

⁵ *Pharm. Jour. Trans.* (3), 2, 193.

⁶ *Pharm. Jour. Trans.* (3), 13, 461.

β -Barbaloin to the similar principle existing alike in Socotrine, Zanzibar and Jafferabad aloes.

During the time of these discoveries and for some years afterward many prominent investigators instituted researches for the purpose of clearing up the confusion which seemed to exist among these similar principles and also to investigate their therapeutical activity which some writers believed to be of little or no value. Among the names of writers who accomplished much in this respect are: T. and H. Smith, Stenhouse, Groves, Flückiger, Histed, Pareira, Tilden, Dobson and Craig.

Three distinct aloins were acknowledged to exist, Nataloin, Barbaloin and Socaloin. Nataloin is seldom found in commerce, and at the last revision of the U. S. P., Barbaloin and Socaloin were given official recognition.

In 1870, W. A. Tilden¹ made a thorough investigation of the subject in which he ascertained the following facts: Aloin in pure solutions is liable only to tardy alteration; exposed to the air the solution deepens in color by absorption of oxygen; this change is hastened by the addition of a small quantity of alkali to the solution.

Preparations of aloes upon standing for a long time, lose their bitterness without sensibly impairing their therapeutical activity and, in his opinion, aloin could not be considered the active constituent of aloes, as it possessed very little action.

He was immediately contradicted by T. and H. Smith,² who contended that the dose of aloin bore a simple ratio to the dose of the drug itself and was of unvarying effect.

Dr. Wm. Craig³ in 1875, in an able article, summed up his conclusions regarding aloin in the following words:

"(1) Aloin may, by exposure to air, undergo considerable chemical change without losing its physiological activity as an active aperient.

"(2) The resin when thoroughly freed from aloin possesses no purgative properties and, therefore, cannot be the active principle of aloin.

¹ *Pharm. Jour. Trans.* (3), 1, 375.

² *Pharm. Jour. Trans.* (3), 1, 402.

³ *Am. Jour. Pharm.*, 47, 349.

"(3) The resin is not the cause of the griping which sometimes follows the administration of the drug.

"(4) Aloin is an active aperient and is, in all likelihood, the active principle of aloes."

This same author, at that time, favored its admission into the British Pharmacopœia.

Another writer upon the subject, A. P. Brown,¹ found aloin made from Barbadoes aloes to possess effects equal to the same dose of the drug, and also found that the extract made from the residue after the separation of the aloin was entirely destitute of purgative properties; two statements which seem to be mutually contradictory.

In 1887, J. F. Brown,² confessed his bewilderment in regard to the properties of aloin and reviewed the work of preceding investigators.

He showed numerous contradictory statements, mostly therapeutical, and he also asks for information as to the true properties of a substance which was said to have the following solubilities, in water: 1 in 60, 1 in 90, 1 in 500, insoluble and freely soluble.

The preceding extracts are typical examples of the contradictory nature of the entire literature upon the subject and it is not surprising that the properties of the commercial product of the present time should differ from the properties attributed to it by the early investigators.

The following table shows a few of the solubilities ascribed by different authorities to the various aloins:

BARBALOIN.				
	<i>Sol. in Water.</i>	<i>Alcohol.</i>	<i>Ether.</i>	<i>Remarks.</i>
	15° C.	15° C.		
U. S. P.	1 — 60	1 — 20	1 — 470	
Pharmacographia	freely, warm sparingly, cold	freely, warm sparingly, cold	insoluble	
SOCALOIN.				
	15° C.	15° C.		
U. S. P.	1 — 60	1 — 30	1 — 380	
Pharmacographia	1 — 90	1 — 30	1 — 380	
VARIETY NOT MENTIONED.				
Gmelin's Handbuch	sparingly			According to:
Gmelin's Handbuch	1 — 600	readily		Stenhouse
Gmelin's Handbuch	1 — 10	1 — 2 (86% alc.)	1 — 8	Smith Robiquet

¹ 1877. *Proc. Amer. Pharm. Assoc.*, 401.

² *Amer. Jour. Pharm.*, 59, 193.

	<i>Sol. in Water.</i>	<i>Alcohol.</i>	<i>Ether.</i>	<i>Remarks.</i>
Fehling's Handwörterbuch	1 — 600 1 — 60 cold	1 — 2 (86% alc)	1 — 8	
Storer's Dictionary	1 — 5 boiling	very soluble	insoluble	
Wohler's Organic Chem.	difficultly cold	difficultly cold		
Phillips Mat. Med. and Therap.	sparingly cold readily, warm 1 — 600 cold	insol. cold readily, warm		
Sohns' Dict. Act. Prin. Plants	1 — 10 boiling	soluble	diff. soluble	
Ladenburg's Handwörterbuch	difficultly cold easily hot			

In the experiments upon commercial samples the solubility was taken at 25° C. instead of 15° C., as the latter temperature is seldom attainable for working purposes in an ordinary laboratory.

The solubility in water was ascertained by placing 1 gramme of aloin in a stoppered and graduated cylinder and adding the solvent in small portions, agitating thoroughly after each addition until solution was completed. It was observed that at a low temperature (15° C.) the aloin was only sparingly soluble, but at 25° C. it was dissolved with a perceptible deepening in color of the solution. The solubility in ether was ascertained by placing 1 gramme of aloin in a cylinder as before, adding 30 c.c. of ether and agitating occasionally for two hours, 20 c.c. of the filtered ether were then evaporated to dryness in a tared watch glass, and the solubility calculated from the weight of the residue.

The solubility in alcohol was taken in the same manner as the solubility in water. The melting point was taken by placing a small quantity in a capillary tube and immersing the tube in melted paraffin along with a thermometer. The lowest temperature at which it became transparent in the thinnest part of the tube was observed as the melting point.

The ash was calculated after incinerating a weighed portion in a platinum crucible. Notes were also made of the general appearance and microscopical characteristics of the different samples under consideration, and following is the report of their examination:

	Soluble in Water.	Soluble in Alcohol.	Soluble in Ether.	Degree Centigrade. Melting Point.	Per Cent. Ash.	Color.	Microscopic Appearance.
1	1-100	1-40	1-800	90°	0.50	Dark brownish yellow.	Distinct crystals, and crystal masses.
2	1-70	1-30	1-2500	118°	0.34	Light yellow.	Crystalline powder.
3	1-80	1-35	1-2000	115°	0.04	Light yellow.	Same as No. 2.
4	1-95	1-20	1-1170	100°	0.60	Brownish yellow.	Same as No. 1.

The variations in the properties attributed by the different authorities can only be accounted for upon the ground that the samples of aloin experimented upon varied greatly in purity.

Upon referring to the samples examined by the writer it will be noticed that a distinct ratio exists between the solubility in water and the solubility in ether; thus number one is soluble in 800 parts of ether and only 100 parts of water, while number two is soluble in 2,500 parts of ether and 70 parts of water. The presence of a small amount of ether-soluble resin would partially account for this difference, and it is extremely probable that strictly pure aloin is soluble to a less extent than any of the figures given; indeed one sample of aloin which was made by the writer was soluble in 16,000 parts of ether, but as further experiments are being made in this direction, it is hoped that something more definite regarding the solubility of strictly pure aloin can be reported in the near future.

305 CHERRY STREET, PHILADELPHIA.

LABORATORY NOTES ON PEROXIDE OF HYDROGEN, OIL OF WINTERGREEN AND OIL OF TURPENTINE.

BY CHARLES H. LA WALL, PH.G.

(Read before the Pennsylvania Pharmaceutical Association, June, 1895.)

Peroxide of hydrogen is a recent addition to the U. S. P., and it is required that it shall contain about 3 per cent., by weight, of absolute peroxide of hydrogen, corresponding to about ten volumes of available oxygen.

Manufacturers of this preparation, while recognizing the fact that the solution, as commonly made, is not very stable, and easily loses strength during transportation and handling, are very careful that it shall not contain a large excess of the dioxide over the ten volumes required.

The following table shows the volume strength of twenty-five samples examined during the past few months:

Volume.	Volume.	Volume.	Volume.
1. . . 9'98	8. . . 9'98	15. . . 9'84	22. . . 9'90
2. . . 10'02	9. . . 10'23	16. . . 9'28	23. . . 10'02
3. . . 9'33	10. . . 10'02	17. . . 9'35	24. . . 10'28
4. . . 9'03	11. . . 9'98	18. . . 10'28	25. . . 10'37
5. . . 9'97	12. . . 10'06	19. . . 10'19	
6. . . 10'07	13. . . 10'16	20. . . 10'07	Average of 25,
7. . . 10'25	14. . . 9'77	21. . . 10'15	9'94

OIL OF WINTERGREEN.

Oil of wintergreen is described officially as a volatile oil distilled from the leaves of *Gaultheria procumbens*, and although oil of sweet birch and methyl salicylate are no doubt often substituted for it in the market, the difference is so slight as scarcely to be detected.

Following are the characteristics of a number of samples examined by the writer since January 1, 1895; they were all offered as oil of wintergreen, and there was great uniformity among the samples, except as regards color, which varied from deep red to colorless. The specific gravity of a number of the samples was slightly higher than is required by the Pharmacopœia, which specifies from 1.175 to 1.185.

Specific Gravity.	Degree, Centigrade. Boiling Point.	Color.	Specific Gravity.	Degree, Centigrade. Boiling Point.	Color.
1. . . 1.180	217°	Dark red.	9. . . 1.186	215°	Yellow.
2. . . 1.180	214°	Light red.	10. . . 1.184	215°	Yellow.
3. . . 1.186	214°	Colorless.	11. . . 1.186	216°	Red.
4. . . 1.182	215°	Red.	12. . . 1.187	216°	Light red.
5. . . 1.185	216°	Dark red.	13. . . 1.184	216°	Yellow.
6. . . 1.185	215°	Colorless.	14. . . 1.186	216°	Colorless.
7. . . 1.187	215°	Colorless.	15. . . 1.182	215°	Yellow.
8. . . 1.189	215°	Red.			
Average of 15 samples				Specific Gravity. . . 1.184	Boiling Point. . . 215°

OIL OF TURPENTINE.

Two different grades of oil of turpentine are official; the following samples represent the commercial variety. They show great uniformity in characteristics, and it is a matter of especial note that although the samples represent several hundred barrels of turpentine, there was only one specimen which was insoluble in three parts of alcohol:

Specific Gravity.	Degree, Centigrade. Boiling Point.	Solubility in three parts Alcohol.	Specific Gravity.	Degree, Centigrade. Boiling Point.	Solubility in three parts Alcohol.
1. . . 0.8598	153°	Soluble.	9. . . 0.8580	154°	Soluble.
2. . . 0.8578	150°	Soluble.	10. . . 0.8558	155°	Soluble.
3. . . 0.8589	150°	Insoluble.	11. . . 0.8601	155°	Soluble.
4. . . 0.8670	150°	Soluble.	12. . . 0.8587	155°	Soluble.
5. . . 0.8673	153°	Soluble.	13. . . 0.8565	154°	Soluble.
6. . . 0.8600	153°	Soluble.	14. . . 0.8592	154°	Soluble.
7. . . 0.8590	152°	Soluble.	15. . . 0.8540	155°	Soluble.
8. . . 0.8550	155°	Soluble.			
Average of 15 samples				Specific Gravity. . . 0.8591	Boiling Point. . . 153° C.

305 Cherry Street, Philadelphia.

EDITORIAL.

THE NEED OF MORE CHEMISTRY BY THE MEMBERS OF THE MEDICAL PROFESSION.

It is true that there are some members of the medical profession who are skilled chemists, and such have an advantage over their brethren which cannot be estimated. The great majority of physicians, however, are handicapped by dense ignorance of even the elements of chemistry, either because they have forgotten, or because they never knew. Most of these know enough to let the subject alone, but a few do not, and rush into print with statements that must be startling to the average chemist.

We have been led to make these remarks by reading a paper on *Calomel* "read in the Section on Practice of Medicine, at the Forty-sixth Annual Meeting of the American Medical Association, at Baltimore, Md., May 7-10, 1895," and published in the journal of the Association, June 1 (Vol. 24, page 836).

The author, very early in his paper, makes the following sweeping statement:

"Calomel is subject to adulteration; to improper purification in manufacture; and to chemic changes both atmospheric and in chemic mixtures. Bichlorid of mercury is the most common impurity found in it, and this varies from the smallest trace to comparatively large amounts. * * *

"On the other hand, calomel may contain such large amounts of barium, calcium, lead and other impurities that its action is greatly lessened and rendered almost inert. With these thoughts before us, and a thorough knowledge of making appropriate chemic tests for their confirmation, we can often explain untoward actions which might otherwise be attributed to a pure preparation."

The inference to be drawn from the foregoing quotation is, that between adulteration and dilution the unfortunate patient to whom calomel is administered has a very slim chance of recovery.

As a matter of fact, calomel is very rarely adulterated, and still more rarely does it contain corrosive sublimate or any other impurity. Probably no official chemical has received more study and care at the hands of manufacturing chemists than has calomel. Its production is attempted only by a very few of the largest manufacturers, which fact alone is somewhat of a safeguard, since an impure lot would certainly be traced to its origin. Then it does not occur in isolated crystals, as suggested by the author of the aforesaid paper, but is usually amorphous, or nearly so; the Pharmacopœia requiring it to be "a white impalpable powder, becoming yellowish-white on being triturated with strong pressure, and showing only small isolated crystals under a magnifying power of one hundred diameters."

That such a paper with such chemistry in it should have been read where it was is not surprising; but not only was it printed with all its faulty nomenclature in the journal of the Association, but it was discussed in the meeting in a way to give it support, except that one member questioned the statement about contamination with corrosive sublimate, and announced that he had, with the aid of a prominent chemist, been unable to find any samples of calomel that contained corrosive sublimate. The reader is staggered, however, by the following statement from the same member: "We might have some oxid of calomel, but there was no single instance in which bichlorid of mercury was found."

"Oxid of calomel" is a new compound to us, and "bichlorid of mercury" is without parallel as an illustration of ancient nomenclature and modern reform spelling of chemical terms.

Where were the chemists in the meeting that such incongruous statements were allowed to go unchallenged?

COFFEE OR CHICORY.

Under the title of "Chicory in Belgium," Consul Henry C. Morris, in Consular Report No. 169, page 157, gives some statistics concerning the exportation of chicory from that country, which should engage the attention of every one in this country who is interested in maintaining our food supply at a reasonable standard. The consul evidently looks on the increased demand for chicory in this country as commendable, while we are inclined to take the opposite view.

Chicory has rather a bad name among pharmacists because it occasionally masquerades as taraxacum. It has long been used as a cheap adulterant and substitute for coffee in England and on the continent of Europe, and the result is that one rarely gets in those places the delicious cup of coffee that he is accustomed to in the United States.

In England the substitution and admixture has been carried to such an extent that coffee has, to a large extent, given way to tea, which has become the popular beverage.

In the United States, on the contrary, coffee is the more popular of the two, because here it is the custom of many consumers to buy the coffee in an unground condition and either have it ground at once in their presence, or grind it at home as needed. Of course this does not apply to boarding houses and hotels, where cheaper grades are often employed, which means an admixture of chicory or some other cheap material.

It is safe to say that no consumer of coffee ever goes to his grocer and demands chicory, or a mixture of that substance and coffee. Chicory yields a black, astringent infusion, which is devoid the stimulating and aromatic properties that are a necessary part of coffee.

All the statements about chicory being a healthy drink, recommended by the medical profession and beneficial to those suffering from disorders of the stomach, are fairy tales invented by those commercially interested in the substitution of it for coffee.

The yearly chicory crop of Belgium amounts to about 350,000 tons, of which 4,000 tons are sent to the United States. The growth of the demand for this adulterant in this country may be seen by the value of the imports of it from Belgium for five years as follows:

1889	11,166 dollars.
1890	39,440 "
1891	80,074 "
1892	78,295 "
1893	129,662 "

The report of Consul Morris has already called forth some criticism in one of our leading magazines, but the newspapers, as a rule, have echoed a favorable

sentiment under the false impression that chicory would benefit the poor. Owing to the adverse criticism of his report, the same consul has seen fit to send another communication on the same subject, entitled "Chicory as a Beverage." (Consular Report No. 176, page 139, May, 1895). In this report he defends his former remarks, and advocates its use as a beverage because of its harmlessness, and because it is used in England, France and Belgium, under legal restrictions.

We cannot see, however, that the weight of his argument is strengthened in the least. We cannot get legal restrictions in this country; popular sentiment is stronger to keep an objectionable article out, and on that we must depend.

Chicory belongs in company with prepared and roasted beet roots, rye bread, acorns and all the other coffee substitutes that are utterly devoid of the properties for which coffee is employed.

It would be an excellent substance for Congress to place a high duty upon, for it is not demanded by the consumer, and can only be sold under some other name, or in a mixture.

THE AMERICAN MEDICAL ASSOCIATION AND PATENT MEDICINES.

There is no doubt that the members of the medical profession, as a class, are opposed to patent medicines. The encouragement which these remedies occasionally receive from physicians is usually due to carelessness or inexcusable ignorance.

The American Medical Association, at its May meeting in Baltimore, placed itself clearly on record in regard to this subject, and in a manner that is highly commendable. It involves a much needed reform in the Association's journal, as shown by the following extract from the report of the Board of Trustees concerning that journal:

"During the year no advertisements of secret remedies have been accepted that were not accompanied by a formula, but to still further comply with what appears to be the desire of a large number of those interested in the highest success of the journal, the editor, with the termination of present contracts, has been instructed to accept no advertisements of medicinal preparations, the proprietors of which do not give a formula containing the official or chemic name and quantity of each composing ingredient, to be inserted as a part of the advertisement."

This report was adopted with considerable enthusiasm, and we think the Board need not have used the guarded language it did by saying they proposed to "comply with what *appears* to be the desire of a *large* number," for the sentiment of those present not only *appeared* to be, but actually *was* unanimous.

As many of the advertisements in the above-mentioned journal, as well as in many other medical journals, have long been a standing disgrace to the profession they represent, we, more than a month after the meeting, made an examination of the advertising pages of the Association's journal, but were unable to notice that any decided change had taken place. We, therefore, concluded that the advertisers' contracts had not expired.

There were, however, a number of advertisements in which the formulas were given, and the conclusion was that their contracts had expired, or else they were preparing to renew.

Two of these formulas were so unique, and at the same time so interesting, that we venture to enlighten our readers by reproducing them here, as follows:

ANTI-KAMNIA.

"FORMULA."

"A combination of coal tar derivatives of the series $C_n H_{2n-6}$, into which the amines have entered, forming the various amido-compounds. Antikamnia has as its base the derivatives of the amido-benzoles, so combined as to obviate the bad effects caused by many of this series of organic bodies when administered alone."

CAMPHO-LYPTUS.

"COMPOSITION."

"Eucalyptol, Campho-Thymic Acid, Hydrous Chloral."

No possible good can result from publishing such formulas as these. They are simply ridiculous, and the *Journal of the American Medical Association*, by admitting them, lays itself open to the possibility of being considered the most "gullible" medical journal on the face of the earth.

There is no secret about the faculty necessary to decide what should be admitted. We could name a dozen members of the medical profession who possess that inborn knowledge that would enable them to decide almost in a moment on the admissibility of an advertisement. The result, however, would be such a "clean sweep" in the advertising pages of the Association's *Journal* as to be apparent to the most casual reader.

There is another lesson to be derived from these so-called formulas. We have heard a great deal in the past few years about legislation to control the manufacture and sale of patent medicines, and nearly all of the suggestions are based on the publication of the formula on the label. But the experience of the American Medical Association shows us that it will be necessary to define what shall constitute a formula.

ALCOHOL LEGISLATION.

There are many ways of viewing almost every subject, and alcohol legislation is not an exception. The Philadelphia College of Pharmacy has endorsed recommendations to the Secretary of the Treasury asking for the enforcement of the present law, as it is believed it would be to the advantage of the pharmacist. The *Chicago Retail Druggists' Association*, however, takes a different view of the subject, and has sent the following resolutions to many State Associations asking for their adoption:

Resolved, That this association favors the repeal of the clause in the present tariff law exempting alcohol used in manufactures from internal revenue taxation, on the ground primarily that the law in its present form would inevitably be attended with gross discrimination against the retail druggist, and great resulting loss to his business and profession, and with no material advantage to the people to compensate for the serious loss to the national revenue from the remission of the said tax.

Resolved, That a special Committee on National Legislation, to consist of three members, be appointed with authority to act independently, or in co-operation with such similar committees as may be appointed by other pharmaceutical associations, in behalf of measures promotive of the interests of legitimate pharmacy and the retail drug trade as said interests may be affected by national legislation, including specifically the said law relating to alcohol taxation, the laws concerning trade-marks, copyrights and patents as related to medicinal preparations, and the law imposing an annual tax on druggists as retail liquor dealers.

It is the hope of the undersigned committee that your association will act without delay in this important matter, and thus enable the sentiment of the retail drug trade of the country properly to make itself known, and to assert its due influence in behalf of right legislation and against such laws as may be inimical to the profession and trade.

This committee hopes to be favored with notice of the appointment of the committee suggested, with names and addresses of the members. All communications relating to this letter should be addressed to A. E. Ebert, Secretary, State and Polk Streets, Chicago.

We have the honor to be, with fraternal regards,

WILLIAM BODEMANN,

ALBERT E. EBERT,

GEORGE P. ENGELHARD,

Committee Chicago Retail Druggists' Association.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

KATECHISMUS DER STÖCHIOMETRIE, mit besonderer Rücksichtnahme auf die Bedürfnisse der Studierenden der Pharmazie, Medizin und Technik. Sechste Auflage. Albert und Hermann Frickhinger. München, 1895. 284 Seiten.

Catechism of Stoichiometry, with special reference to the needs of students of pharmacy, medicine and technics. Sixth edition. Albert and Hermann Frickhinger, Munich. 1895. 284 pp.

The first edition of this little manual appeared in 1844, under the authorship of the elder Frickhinger, an apothecary of Nördlingen, who continued it through five editions, the last appearing in 1873. Now, with the aid of his son, it is again brought out in a new edition, the sixth. The book has been very popular in Germany, and, indeed, seems to us to be a very handy and useful book for the classes of students referred to in the title. It is written in the form of a series of questions and problems, to which full answers and solutions are given, with all needed explanations. It includes first simple arithmetical problems, then questions on the subjects of volume and notation of elements and the rules for the formation and naming of molecules, the names, formulæ and molecular weights of all compounds likely to interest the pharmacist or medical student, practical problems in volumetric and gravimetric analysis, and lastly, on the main outlines of chemical theory. A very full index completes the work, and makes it thoroughly available for ready reference.

ON THE SPEED OF THE LIBERATION OF IODINE IN MIXED SOLUTIONS OF POTASSIUM CHLORATE, POTASSIUM IODIDE AND HYDROCHLORIC ACID. By Herman Schlundt. Bulletin of the University of Wisconsin, Science Series, Vol. I, No. 1. Madison, Wis. 1894.

We should have more contributions like this from our pharmaceutical schools. The author takes up a subject in chemical dynamics and systematically pushes it to a successful conclusion. The results can best be understood by quoting the conclusions as follows:

(1) The speed of the reaction is influenced to a marked degree by the temperature, the speed increasing with the rise of temperature.

(2) The presence in the mixture of an excess of one or more of the components increases the speed. The effect of an excess of potassium iodide is about the same as an equivalent excess of potassium chlorate. But a corresponding excess of acid causes a greater increase of speed.

(3) Other things being equal, the speed of the reaction is modified by degree of concentration of the mixtures, the speed increasing with the concentration.

(4) To obtain the complete reduction of potassium chlorate by potassium iodide and hydrochloric acid in a comparatively short time, the solutions must be concentrated, there must be quite an excess of both potassium iodide and hydrochloric acid, and the mixture must be strongly heated.

(5) The presence of an excess of the ordinary inorganic acids accelerates the reaction. Assuming their respective influences as indicating their relative strengths, the results on acceleration show the following order of strength: (1) hydrobromic; (2) hydrochloric; (3) nitric; (4) sulphuric.

(6) Organic acids and boric acid do not increase the speed.

UEBER SECRETE UND SECRETBILDUNG. Von Prof. Dr. A. Tschirsch. Reprint from *Zeitschrift des Allgemeinen österr. Apotheker-Vereines*. No. 30. 1894.

WEITERE MITTHEILUNG ÜBER DAS KUPFER VOM STANDPUNKTE DER TOXIKOLOGIE. Von Prof. Dr. A. Tschirsch. Reprint from *Zeitschrift des Allgem. österr. Apotheker-Vereines*. No. 35. 1894.

UNTERSUCHUNGEN ÜBER DIE SECRETE. Mitgetheilt von A. Tschirsch. 10 UEBER DEN TOLUBALSAM. Von Paul Oberlander. Reprint from *Archiv der Pharmacie*, **232**, 7 und 8 Heft., 559. 11 UEBER DEN SUCCINIT. Von E. Aweng. Reprint from *Archiv der Pharmacie*, **232**, 9 Heft.

SEMI-ANNUAL REPORT OF SCHIMMEL & CO. April, 1895.

VIERTELJAHRESSCHRIFT ÜBER DIE FORTSCHRITTE AUF DEM GEBIETE DER CHEMIE DER NAHRUNGS-UND GENUSSMITTEL. Neunter Jahrgang, Viertes Heft.

FREE HYDROCHLORIC ACID—IS ITS ABSENCE FROM THE STOMACH A SIGN OF CANCER? By Richard B. Faulkner, M.D. Reprinted from the *Journal of the American Medical Association*, March 2, 1895.

A TREATISE ON THE WINE OF COD-LIVER OIL, WITH PEPTONATE OF IRON. Detroit. Frederick Stearns & Co.

The following new periodicals relating to pharmacy have recently appeared:

Annales de Pharmacie is a monthly journal devoted to practical pharmacy, pharmacognosy, foods, chemistry, toxicology, microscopy, hygiene, professional interests and legislation. The editor is Fernand Ranwez, pharmacist at Louvain, Belgium, and the publisher is Louis Honart, likewise a pharmacist, at the same place. The first number starts out well with original articles on the "Adulteration of Saffron," "Syrups of the Belgian Pharmacopoeia" and "Pharmacy in Belgium at the present time." There are also reviews from other journals—varieties, notes and bibliography. The two succeeding numbers which have reached us are fully equal to the first.

Medicine.—A monthly journal of medicine and surgery, edited by Harold N. Moyer, M.D., and published by George S. Davis, Detroit, Mich. The first number consists of sixty-four pages, and is made up of a number of original papers by well-known medical writers, and of a comprehensive review of the progress of medical science and literature.

The Buffalo Druggist is a claimant for honors in the field of pharmaceutical literature; it is devoted to the advancement of pharmacy and the interests of the general drug, paint and oil trade.

The Graduate, which has been issued annually by the Alumni Association of the Chicago College of Pharmacy, will in future appear quarterly.

PROCEEDINGS OF THE MISSOURI STATE PHARMACEUTICAL ASSOCIATION, held at Excelsior Springs, Mo., June 12 to 15, 1894. A number of original papers appear in the volume, some of which have already been printed in this Journal.

MINUTES OF THE PHARMACEUTICAL MEETING.

The meeting was held Tuesday, May 21st, at 3 P.M. Prof. F. X. Moerk, Ph.G., was elected Chairman.

On motion the reading of the minutes of the last meeting was dispensed with.

A specimen of *Chêne gomme*, an educt of the *Spermolepes tannifera*, was presented to the cabinet by Prof. E. Haeckel, an honorary member of our College, residing at Marseilles, France. It is said to contain about 25 per cent. to 30 per cent. of tannin. The gum is obtained in Algiers, and is said to be very abundant there.

Mr. Henry N. Rittenhouse, Ph.G., presented a specimen of California licorice root, gathered in San Joaquin Valley, where it has been growing wild for twenty years under rather unfavorable circumstances.

A paper upon the Tannin of Cloves, by W. L. Peabody, Ph.G., was presented. His attention was called to the subject by the statement that cloves contained 18 per cent. of tannin. The samples examined showed the presence of 10.03 to 13.35 per cent. of tannin. A cheap specimen of cloves showed 5 per cent. of tannin; examination showed the tannin to be identical with nutgall-tannin. It was thought that the percentage of tannin might be used as a means of forming a proximate judgment regarding the purity of cloves, as a tannin-bearing substance would not likely be used as a sophistication.

Anatolian Licorice Root was the subject of a paper by James W. Nickum, Ph.G., of Salt Lake City, Utah. From this paper we learn that the root contains 23.84 per cent. of extract by the use of acetone, but it yields less with ethylic alcohol. Turkish root yielded 14.06; Spanish root, 7.02; Persian root, 7.02 with acetone. Anatolia is a corruption of the word Andoli, and the district meant by this term is almost identical with Asia Minor.

The remaining paper of pharmaceutical character was one by Miss Florence Yaple, of Chillicothe, Ohio, upon Twelve Varieties of Commercial Cocos. The examination showed that there had been little or no adulteration practiced in any of the specimens tested. The papers in full are contained in the June number of the JOURNAL.

There being no further business, a motion to adjourn was made and carried.

T. S. WIEGAND.

PHARMACEUTICAL ASSOCIATIONS.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The Pennsylvania Pharmaceutical Association held its eighteenth annual meeting at Eagle's Mere, Penna., June 18 to 21, 1895.

The pleasant surroundings, the fine weather and the admirable combination of business and pleasure made this one of the most notable meetings in the history of the Association; although the attendance was not so large as that on a number of previous occasions, yet the sessions were attended by a large number of those present, and almost every one took an active part in the proceedings.

The President, W. H. Reed, in his address reviewed the condition of the profession during the past year and made a number of suggestions whereby the Association might be improved; these suggestions were on reference to a committee, nearly all adopted at a subsequent session. Delegates were in attendance from the Associations of New York State, New Jersey and Maryland.

The Secretary reported on the general condition of the Association and gave a detailed account of the publication of the proceedings. The Treasurer was able to show a very satisfactory condition of the Association's finances.

The following officers were elected:

President, H. N. Cox; First Vice-President, John H. Hahn, Second Vice-President, D. M. Krauser; Treasurer, J. L. Lemberger; Secretary, J. A. Miller; Executive Committee, A. R. Durham, W. S. Seabold, J. H. Knouse.

Resolutions were adopted favoring the betterment of the pharmacist in the army and navy, and asking that his rank be made that of assistant surgeon.

The subject of tax-free alcohol was brought up and a subsequent session was set apart for its consideration.

At this session the resolutions of the Chicago Retail Druggists' Association on this subject were read, as well as the combined circulars of the National Wholesale Druggists' Association, the Philadelphia Drug Exchange and the Philadelphia College of Pharmacy.

After some discussion the Association placed itself on record as favoring tax-free alcohol as recommended by the circular of the three last-named associations.

J. W. Miller explained the intentions of the Universal Trade Association of Retail Druggists, and asked for an endorsement of their plan of dealing with various evils which injure the pharmacist. This Association, with headquarters at Detroit, Michigan, proposes, with a million dollars capital, to furnish stamps to manufacturers by which the packages may be traced to the one who offers it at a cut rate. This plan was at first endorsed, but at a subsequent session it was reconsidered and after much discussion it was decided to recommend the formation of a national retail druggists' association, without specifying the particular one at Detroit.

C. T. George presented the report of the Committee on Legislation which was adopted.

W. L. Cliffe read the report of the Committee on Adulteration, and gave the results of analysis of prescriptions compounded by one druggist of Philadelphia. The sum of \$200 was directed to be placed at the call of the Committee.

George J. Seabury was elected an honorary member. A number of delegates and committees reported, and then one whole session was given to the reading of papers.

C. H. La Wall read a paper on *Commercial Aloins* (see page 367), and one on *Laboratory Notes on Peroxide of Hydrogen, Oil of Wintergreen and Oil of Turpentine* (see page 372).

Papers on *The Sabbath as a Day of Rest*, were offered by C. B. Lowe, D. M. Krauser and Emile Ott.

C. B. Lowe presented a paper on *The Pharmacy Law of Pennsylvania and its Administration*, in which he delicately drew attention to some of the defects in the law, as well as weakness in the past administration. C. T. George in discussing the paper admitted some of the short-comings of the Board of Pharmacy, and satisfactorily explained them. It was evidently the prevailing opinion that the members of the Board should receive more money, and that their compensation should come directly from the State Treasury, and not be paid by the pharmacists of the State as at present.

A paper by Louis Emanuel was read. It was in answer to query No. 23: *How may the Pharmacy Law be Efficiently Enforced?*

He illustrated some of the difficulties of enforcing the law, and showed that when properly enforced it would protect the public as well as the members of the pharmaceutical profession.

John F. Patton read an interesting paper on *Tendencies*. After numerous illustrations of the tendency of the human race in general, the author considered the tendency of the pharmacist in particular, as follows:

The present status of pharmacy is that of evolution, with a strong tendency to eliminate the pharmacist. The large pharmaceutical manufacturers, with their wealth, enterprise and acknowledged ability, have not only relieved the pharmacist from the labor of making his own preparations, but they have instructed the physician as to the value of the remedies, and aided him in his practice by applying the same. Ethically, this is all wrong; but it is business. It has tended, however, to the degradation of the profession, and reduced the practice of medicine to a mere matter of consulting manufacturers' catalogues and price-lists, to say nothing of the great damage it has done to legitimate pharmacy. Thus, the queer anomaly is presented of reversing the order of therapeutics, by fitting the disease to the remedy, instead of the medicine to the disease.

The enterprise of the manufacturer does not stop here. We observe a tendency to eliminate the physician also. For, do we not find treatment and dosage, with other information conducive to self-medication, plainly printed on their packages? Having, by the aid of the physician, introduced their products to the consumer, they would now instruct the latter to do without the services of the former—a case of base ingratitude.

A paper was read on *A Glance at the Contributions of Dr. Priestly to Pharmaceutical Science*, by the late Mrs. Susan C. McCay, a lineal descendant of Dr. Priestly. This paper is of considerable historical interest.

A Record of 1,000 Poison Sales was the title of a paper by Emile Ott. This gave a list of poisons called for in a Philadelphia store. Laudanum headed the list, having been called for 284 times. It was closely followed by "Rough on Rats," 275 times, and Paris green 245 times. There was then a decided drop to corrosive sublimate, 80 times. A total of 41 articles were given, representing 1,038 sales. A large number were called for but once.

The remaining papers were: *A Country Drug Store*, by S. H. Hill; *Calculating a Drug Store*, by C. B. Lowe; *Percolating Opium*, *A Tabulated*

List of Poisons and Aromatic Elixir, by Emile Ott; *Sponges*, by William B. Burk.

Some additional reports, and the installation of officers concluded the proceedings.

Gettysburg Springs was selected as the place for holding the next meeting, on June 9, 1896.

THE MINNESOTA PHARMACEUTICAL ASSOCIATION.

The eleventh annual meeting of this Association was held at Lake Minnetonka, Minn., June 11 to 13, 1895.

The following officers were elected: President, William Gausewitz; Vice-Presidents, L. Trautman, M. A. Sheldrup and Miss Emma Combacker; Secretary and Treasurer, C. T. Heller; Executive Committee, S. H. Reeves, A. T. Hall and J. L. Stiles.

The leading paper was by Dr. J. W. Harrah, on *Trade Interests*. The committee, of which he was chairman, advised the formation of a corporation consisting of members of the State Association to manufacture household remedies, to advertise them, and to promote their sale in preference to patent medicines. The Association, as a body, heartily endorsed this recommendation.

G. H. Webster presented a paper on the *Benefit of Pharmacy Laws*.

Prof. J. P. Remington delivered a lecture on *Prescription Difficulties*, to a large and appreciative audience.

The Best Means for a Retail Druggist to Advertise, was the subject of a practical paper by Truman Griffin, and *The Pharmacopœia* was the title of one by C. R. Mærelus.

The second Tuesday of June, 1896, was decided on as the time for holding the next meeting, and Lake Minnetonka was selected as the place.

FLORIDA PHARMACEUTICAL ASSOCIATION.

The ninth annual session of the Florida State Pharmaceutical Association convened in the city of Jacksonville, Fla., May 8th, at the New Duval Hotel.

The meeting was presided over by President F. P. McElroy, of Dade City, with R. J. Martinez, of Jacksonville, Secretary.

President McElroy introduced Mayor Fleeter. The latter extended a hearty welcome to the members, and spoke of the good work that was to be accomplished by the Association.

President McElroy responded in a few words, thanking the Mayor for the kind words expressed, and then read his annual address. He then spoke of the importance of the Association, both to the members and people of the State. He advocated a change being made in the present State pharmaceutical laws, so that general stores could not carry a line of drugs and medicines unless compounded by a duly registered pharmacist, as is necessary in places of more than 200 inhabitants, under the present State law. The President also suggested that a change in section 2 of the law, so that physicians could not compound their own medicines, and thus take legitimate trade away from the drug stores and pharmacies.

The Committee on Legislation reported that a draft of the amendments desired had been prepared and placed in proper hands, with the assurance that the matter would have attention.

The reports of Secretary Martinez and Treasurer Clark were read, and, upon motion, approved.

The afternoon session was largely taken up on matters relating to the work of pharmacists. An interesting letter on "Saw Palmetto," written by Dr. J. M. Dixon, of Titusville, was read.

Officers were elected for the ensuing year, as follows: President, W. I. Woodman, St. Augustine; First Vice-President, J. A. Conover, Jacksonville; Second Vice-President, Dr. Mendoza, Tampa; Third Vice-President, J. H. Pittmann, Tampa; Secretary, M. W. Stewart, Palatka; Treasurer, Francis Lawton, Jacksonville; Local Secretary, H. R. Thomas, Jacksonville.

Committees were appointed by the President, and it was decided to hold the next meeting at Jacksonville, the time to be decided by the Executive Committee.

The Association then adjourned *sine die*.

M. W. STEWART, *Secretary*.

PALATKA, Fla.

OBITUARY.

JOHN S. NEWTON, PH.G.

Dr. John S. Newton, Ph.G., Class of 1866, was born in Philadelphia, Pa., May 29, 1842, and died at his late residence, 4031 Brown Street, West Philadelphia, August 18, 1894, of Bright's disease, aged 52 years, 2 months and 20 days.

He was the oldest son of Ralph and Emily Newton, and received his education in the Locust Street Grammar School and Central High School, and was afterwards made assistant professor of the latter.

He learned the drug business with his father and his brother, Alfred W. Newton, Ph.G., Class of 1864, was his preceptor, while he attended the Philadelphia College of Pharmacy, and graduated in the Class of 1866. He also attended the Jefferson Medical College, and graduated as a physician in 1867. He was married, in 1871, to Miss Frances Taylor, of Troy, N. Y., who died in September, 1883, leaving two daughters, who survive them. In 1879, he was engaged in the drug business in Columbus, Ga., where he contracted the fatal disease; afterwards he removed to Philadelphia, and located in West Philadelphia, where he practiced medicine up to the time of his decease. He was a member of Pennsylvania Lodge, No. 144, Ancient Order of United Workmen, and American Castle, No. 35, Knights of the Golden Eagle. His funeral services were held at Calvary P. E. Church, Forty-first and Brown Streets, on the following Tuesday, August 21, 1895, the interment being private. He was a member of the Alumni Association of the Philadelphia College of Pharmacy, which he joined March 16, 1866.

W. E. K.

EDWARD C. JONES, PH.G.

Edward C. Jones, Ph.G., was born on Fifth Street above Market, Philadelphia, Pa., August 26, 1843, and died suddenly, at Media, Pa., May 29, 1895, aged 51 years 9 months and 3 days.

He was the son of Wm. and Jane P. Jones. His parents were members of the Society of Friends (Orthodox). Edward in early childhood was in delicate

health and was sent to Friends' Select School, Philadelphia, where he received his early training, and afterwards was sent to Westtown Boarding School, Chester County, Pa., where he finished his education. September 6, 1860, when 17 years of age, he went to learn the drug business with Amos H. Yarnall, at the southeast corner Fifteenth and Market Streets, and remained with him four years; during his apprenticeship he attended the Philadelphia College of Pharmacy and graduated with the Class of 1864, being second in class, his thesis being entitled "*Leptandra Virginica*."

During this year the Alumni Association of the Philadelphia College of Pharmacy was organized, and Edward was one of its projectors, and through his untiring efforts in the early days of its existence is due the high place she holds to-day among the graduates of the College. In 1868, he was elected Treasurer of the Association, and has held that honorable position up to the time of his decease, a period of twenty-seven years.

On the 13th of March, 1866, he was elected a member of the College, and has always taken an active interest in its affairs. On the 30th of March, 1874, he was elected by his fellow-members of the College as a member of the Board of Trustees, and he continuously served the Institution as Trustee up to the day of his death, over twenty-one years. In 1864, he became a member of the American Pharmaceutical Association, and was present at the meeting held at Cincinnati, O., and has attended almost every annual session since.

He became a member of the Pennsylvania State Pharmaceutical Association at its organization, and has attended almost all of its sessions and was a faithful and zealous advocate of any improvement or advancement in the Pharmaceutical profession.

After his graduation from the College he went to Chicago, Ill., and spent a short time in the laboratory of E. H. Sargent, and afterwards in the drug store of W. J. M. Gordon, Cincinnati, O.; but his health failed him, and he returned to his native city and entered into business with his former preceptor, at the old-established store, southeast corner Fifteenth and Market Streets. In 1877, his partner, Mr. Yarnall, died, when Mr. Jones succeeded him at the head of the firm of Jones & Shaw, and shortly afterwards Mr. Shaw retired from the firm; when Wm. B. Thompson was associated with him under the firm name of E. C. Jones & Co., and still later Mr. Thompson also retired, when Wm. H. Earl entered the firm, which continued until 1889, when they became involved and Mr. Jones retired from the business, since which time he has been with the firm of Robt. Shoemaker & Co., Fourth and Race Streets, Philadelphia, Pa., as salesman.

Edward C. Jones was highly esteemed by all who knew him, and had a host of friends among the graduates of the College. He had always taken an active interest in all the affairs of the pharmaceutical profession.

He was a consistent member of the Orthodox branch of the Society of Friends, and took a deep interest in all of the affairs of the Society.

His sudden death was a great surprise and shock to his many friends. The day previous he was at his usual avocation, visiting many of the drug stores in the western portion of the city. He returned to his home in Media apparently as well as usual and quite cheerful. He retired to his room about 11 o'clock, after having spent the evening in writing; early the next morning his sister called to him, and, receiving no response, she entered his room, and

found that he had passed quietly away a few hours before without a struggle. We shall miss his genial face and kindly disposition, but we feel assured that our loss has been his eternal gain. He was never married, and leaves an only sister and two brothers to mourn his loss.

W. E. K.

NEWS AND NOTES.

Henry Kraemer, well known as the Reporter on Progress of Pharmacy in the American Pharmaceutical Association, has accepted the chair of *Materia Medica* and *Pharmacognosy* in the Illinois College of Pharmacy. He will devote a year to study in Europe, before assuming his duties in Chicago. Professor Kraemer recently received the degree of Ph.B., after a four years' course at Columbia College, New York.

J. B. Nagelvoort has been appointed Professor of Applied Pharmaceutical Chemistry at the Illinois College of Pharmacy. He has for a number of years been in the analytical department of Parke, Davis & Co., at Detroit.

N. Gray Bartlett, after many years' service as Professor of Pharmaceutical and Organic Chemistry in the Chicago College of Pharmacy, has resigned. The position has been filled by the appointment of Prof. W. A. Puckner.

FORMULAS.

MIXTURE FOR THE RELIEF OF STINGS OF INSECTS.

Solution of ammonia	7 parts.
Collodion	3 "
Salicylic acid	0.3 "

PENCILS OF SALICYLIC ACID.

Salicylic acid	20 grammes.
White wax	25 "
Lanolin	55 "

PENCILS OF SALICYLIC ACID AND CHRYSAROBIN.

Chrysarobin	10 grammes.
Salicylic acid	20 "
White wax	20 "
Lanolin	50 "

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